PRTG Network Monitor 7 - User Manual

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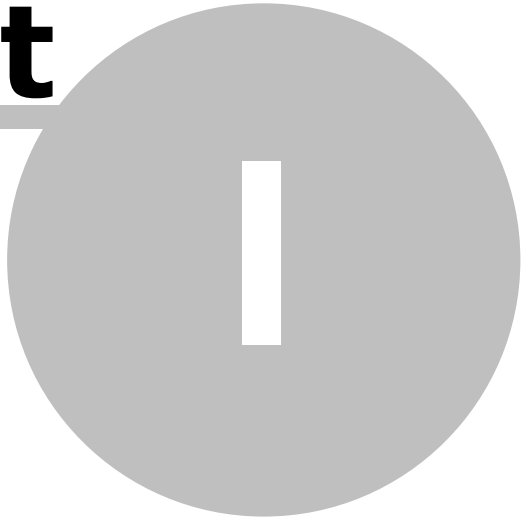

System Requirements

1 System Requirements

Required Operating Systems

The PRTG "Core Service" and "Probe Service" can be run on 32-bit and 64-bit versions of:

- Microsoft Windows XP
- Microsoft Windows Vista
- Microsoft Windows Server 2003
- Microsoft Windows Server 2008

The web interface has been successfully tested on the following web browsers (in order of performance and reliability):

- Mozilla Firefox 3
- Google Chrome
- Apple Safari 3.1
- Microsoft Internet Explorer 8
- Mozilla Firefox 2
- Microsoft Internet Explorer 7

The optional PRTG Tray Tool runs under all Windows versions (Windows 95 or later). The optional iPhone interface was created for Apple iPhone firmware 2.0.

Required Hardware

Please note: The following values are provided as reference for average situations only. Hardware requirements mainly depend on the sensor types used. If you plan installations with more than 500-1,000 sensors or more than 10 packet sniffing/NetFlow sensors please consult the PRTG Site Planner tool ("Help" menu).

- CPU: An average new PC can easily monitor 1,000 sensors (depending on the sensor type).
- RAM: You will need about 150KB of RAM per sensor.
- Hard Disk: You will need about 200KB of disk space per sensor per day (for sensors with 60 second interval).
- An Internet connection is required for license activation (via HTTP or email).

To give you an idea of a high end setup, here is a sample for a very large installation:

We have successfully tested PRTG Network Monitor running with 30,000 SNMP sensors on a Dual-CPU Quad-Core system (Dell 2900 III) with 16GB RAM on Windows 2003 64-bit. This scenario required about 3GB of RAM for the PRTG processes, the CPUs were running at 20% load and it created about 1.5TB of data on the disk for one year. An installation of this size is able to monitor 625 SNMP-enabled switches with 48 ports.

Requirements for Monitored Devices

- SNMP monitoring: The monitored device(s) must be equipped with SNMP Version 1, 2c or 3 (i.e. a SNMP-compatible software must be installed on the device). SNMP must be enabled on the device and the machine running PRTG must be allowed access to the SNMP interface.
- WMI monitoring: In order to use WMI (Windows Management Instrumentation) monitoring you will need a Windows network.
- NetFlow monitoring: The device must be configured to send NetFlow data packets (NetFlow Version 5) to the machine running PRTG.
- Packet Sniffing: Only data packets passing the local machine's network card can be analyzed. Switches with so-called "monitoring ports" are necessary for network-wide monitoring in switched networks.

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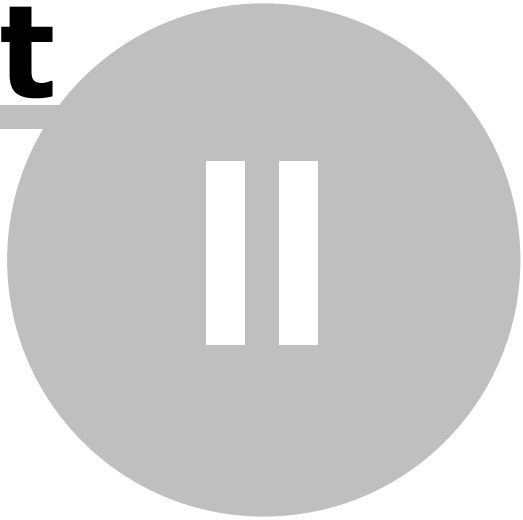


Installation

2 Installation

To use PRTG Network Monitor you need to download and install the software as described in the following sections:

- Downloading the Software: How to get the latest version from Paessler
- Upgrading to Version 7 from Previous Versions: Read this if you have used PRTG Traffic Grapher 6 or IPCheck Server Monitor 5 before
- Installation of the PRTG Core Server: How to install the PRTG core server software on your PC/Server
- Uninstallation: How to remove the software from your PC/Server

2.1 Downloading the Software

Please download the latest version of PRTG Network Monitor from the Paessler website. There are two different installers for PRTG, a public download for the Freeware and Trial editions, and another download for the commercial editions (which is only available for paying customers).

Downloading the Freeware Edition and Trial Edition

Please download the latest publicly available files from the Paessler website at www.paessler.com/prtg/download

Downloading the Commercial Editions

Upgrades are free to customers with an active maintenance contract. Please log into the Paessler website at www.paessler.com/login to get the latest download.

If you do not have an active maintenance contract, please contact sales@paessler.com

2.2 Upgrading to Version 7 from Previous Versions

If you have been running one of the two predecessor products of PRTG 7 (namely PRTG Traffic Grapher Version 6 or IPCheck Server Monitor Version 5), you can import most of your data (monitoring setup and historic data) into PRTG 7. Importing data from earlier versions is not possible.

Please refer to the Import Data from PRTG 6/IPCheck 5 section of this manual for details.

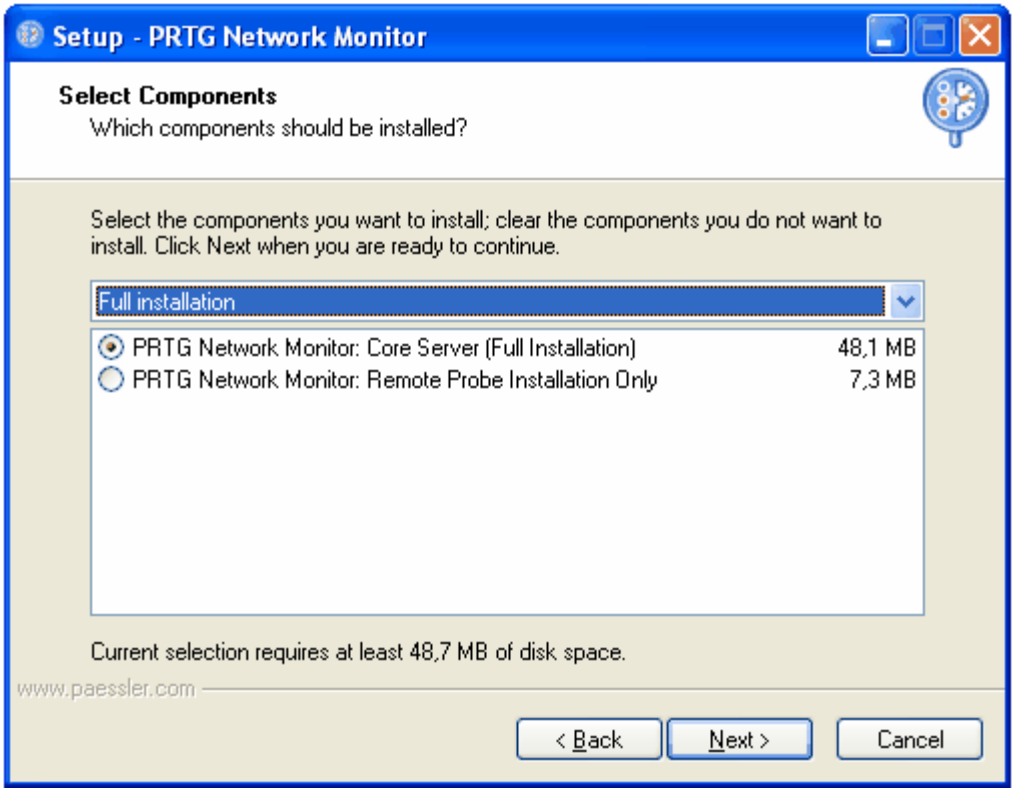
2.3 Installation of a PRTG Core Server

Installing the software is similar to other Windows-based applications. To install the application please insert your PRTG CD-ROM into your computer or open the installation setup routine from the ZIP file you have downloaded.

The usual software installation wizard will guide your through the installation process:

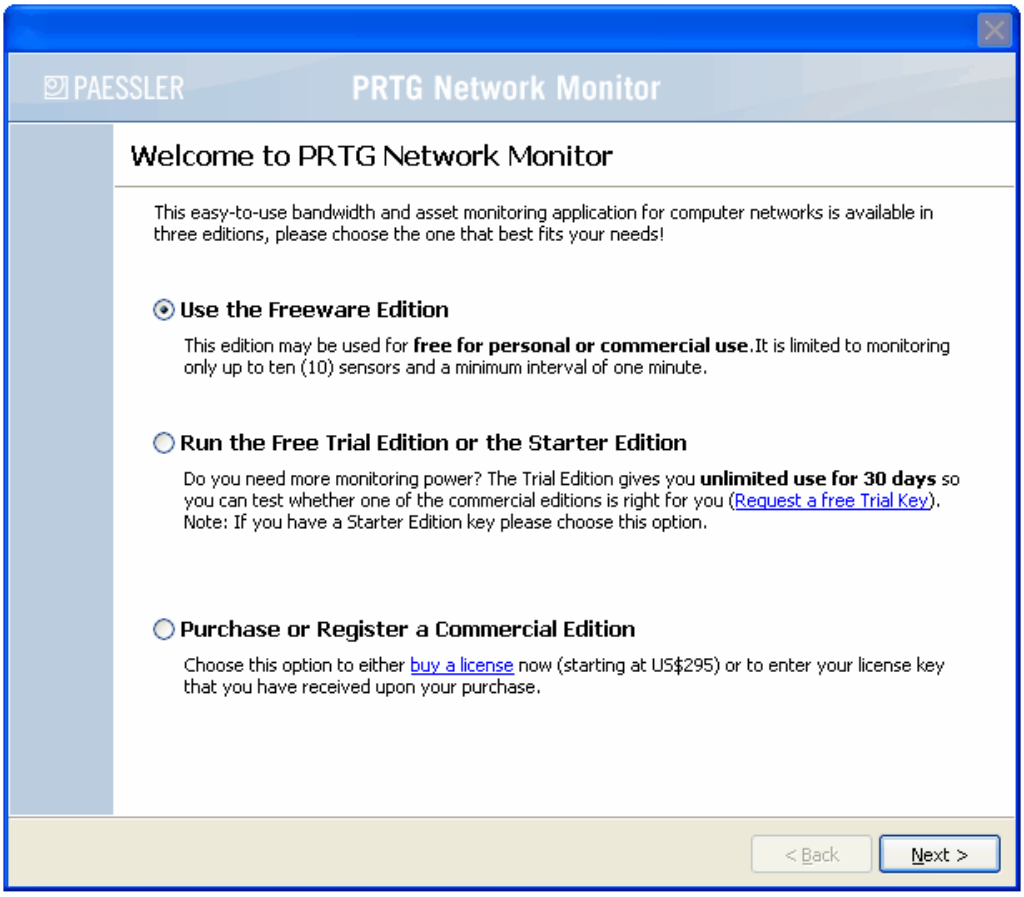
Please click "Next" to walk through the wizard.

After accepting the license agreement, you can choose the folder you wish to install the software in. Afterwards you will see the following installation options:



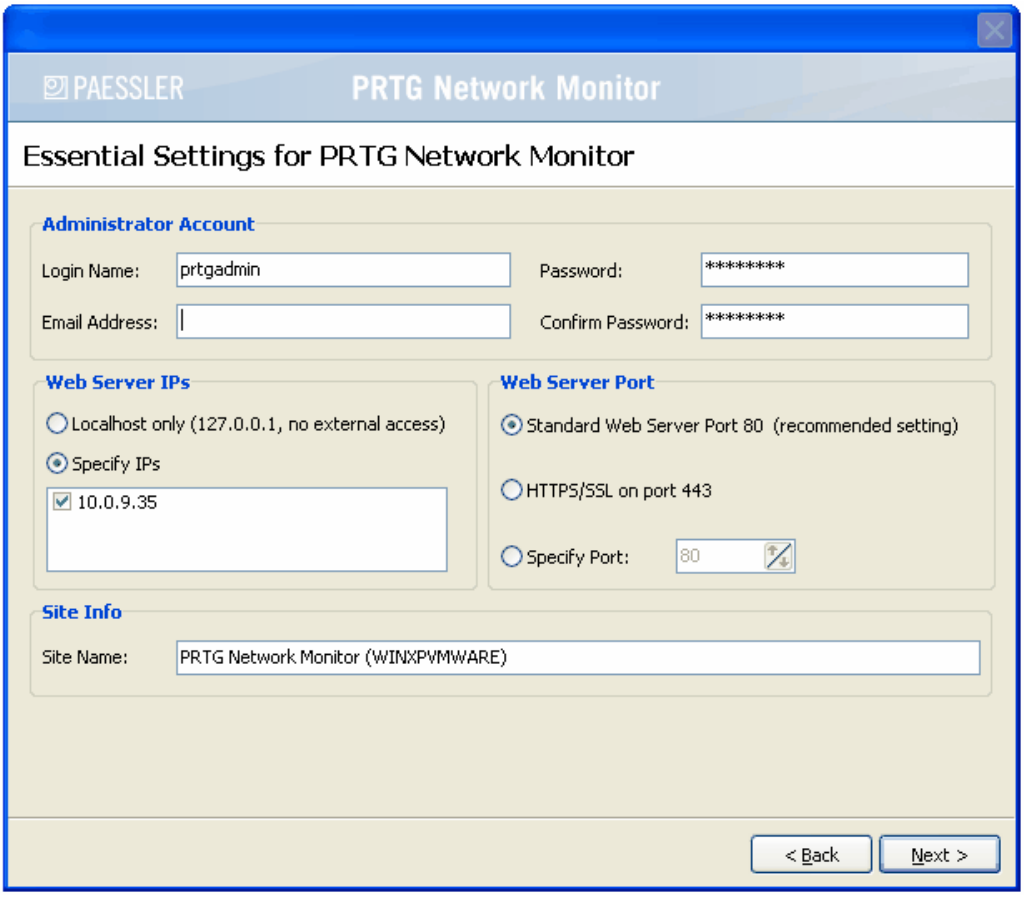
Simply accepting the suggested settings should be perfectly fine for a typical installation. Only if you want to install a remote probe please choose the respective radio box (see Multiple Probes and Remote Probes).

As soon as you click "Next", the necessary files will be copied to your disk and a dialog asking for your license type will appear.



Please select the proper option and enter the necessary data.

Afterwards you will see a dialog with some base settings:



Usually the only edit field that you need to look at is the "Email Address" field. Please enter your email address here.

You may also want to review and edit the following settings:

- Optionally you can provide a "Login Name" and "Password" of your choice (the default is username "prtgadmin" and password "prtgadmin"). Selecting a private password is especially important if you plan to make your PRTG website available on the Internet.
- Please review the "Web Server IPs" and "Web Server Ports" settings. In most cases the default values should be fine.
- Optionally you can enter a custom "Site Name" for your PRTG website (e.g. "My Company Monitoring").

Please click "Next" one more time to finish the installation.

When the installation is complete, the computer may ask you to restart the machine to properly complete the installation. Although you can choose to reboot later, it is strongly recommended to reboot the machine right away to fully complete the installation.

That's it. You can now work with PRTG!

2.4 Installation of a PRTG Remote Probe

PRTG has two modules that perform the monitoring: The core server, which handles data storage, web server and a lot more, plus one or more "probes" which perform the actual monitoring. Please see Multiple Probes and Remote Probes for details.

2.5 Uninstallation

To uninstall PRTG Network Monitor:

- Select the Add/Remove Programs option from the computer's Control Panel.
- Select PRTG Network Monitor from the list of programs.
- Click the Remove button to uninstall the program.

Or select the "Uninstall PRTG Network Monitor" icon from the PRTG Network Monitor group in the Start|Programs menu.

Note: During uninstallation, your monitoring data will not be removed automatically.

After the completion of the uninstallation process of the software please check the PRTG Network Monitor installation folder and delete all remaining files that you do not want to keep. Also, please check the "\Documents and Settings\All Users\Application Data\Paesser\PRTG Network Monitor\V7" (Windows XP) folder for remaining data files which are not automatically removed.

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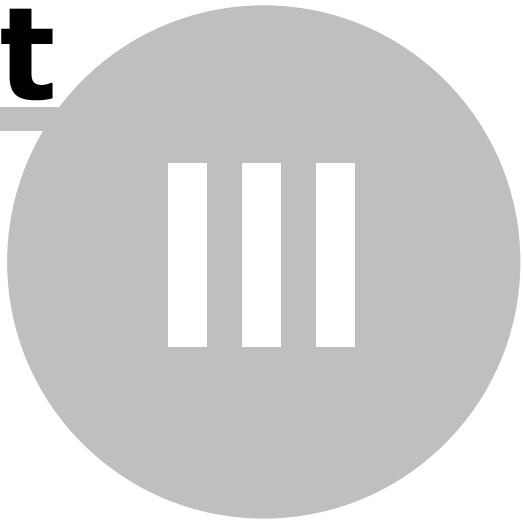


Introduction

3 Introduction

Today, most businesses rely on a computer and network infrastructure for Internet, internal management, telephone and email.

A complex set of servers and network equipment is required to ensure that business data flows seamlessly between employees, offices and customers. The economical success of an organization is tightly connected with the flow of data.

Why Network Monitoring is Important

So, the computer network's reliability, speed and efficiency are crucial for businesses to be successful. But, like all other technical objects, network devices may fail from time to time - potentially causing trouble and loss of sales - no matter what mitigation efforts have been made up-front.

Network administrators, need to take three key steps to maintain network uptime, reliability, and speed:

1. Set up a well-planned network with reliable components.
2. Create recovery plans for the event of device failure.
3. Monitor their network to know about failures as they build up or actually happen.

PRTG Network Monitor, the software described in this document, is a complete solution for monitoring small, medium and large networks.

Monitoring Networks with PRTG Network Monitor

PRTG Network Monitor is a powerful network monitoring application for Windows-based systems. It is suitable for small, medium and large networks and capable of LAN, WAN, WLAN and VPN monitoring.

It monitors network availability and bandwidth usage as well as various other network parameters such as memory and CPU usages. It provides system administrators with live readings and periodical usage trends to optimize the efficiency, layout and setup of leased lines, routers, firewalls, servers and other network components.

The software is easy to set up and use and monitors a network using SNMP, WMI, packet sniffing, Cisco NetFlow as well as many other industry standard protocols. It runs on a Windows-based machine in your network for 24-hours every day. PRTG Network Monitor constantly records the network usage parameters and the availability of network systems. The recorded data is stored in an internal database for later reference.

3.1 Key Features

PRTG Network Monitor can be used to:

- monitor and alert for uptimes/downtimes or slow servers.
- monitor and account bandwidth and network device usage.
- monitor system usage (CPU loads, free memory, free disk space, etc.).
- classify network traffic by source/destination and content.
- discover unusual, suspicious or malicious activity with devices or users.
- control SLA agreements.
- discover and assess network devices.

The PRTG installer contains all modules and software necessary to run the monitoring system without the need for third party modules, inlcuding:

- Paessler's own fast and efficient database system to store the raw monitoring results.
- built-in web server with HTTP and HTTPS support for the user interface.
- mail server for automatic email delivery.
- SQLite SQL Server for storage of monitoring events.
- report generator to create PDF reports.
- graphics engine for user-friendly charts.
- network analysis module to auto-discover devices and sensors.

PRTG Network Monitor supports up many thousands of sensors and can optionally work with multiple remote probes (agents) to monitor multiple sites or network segments from one central core installation. The software is based on Paessler's proven monitoring technology, which has been constantly improved since 1997 and is already used by more than 150,000 users around the world every day.

Attractive licensing packages from freeware (up to 10 sensors) to enterprise level, with thousands of sensors make sure that every user finds the proper solution.

3.2 Available Licenses

There are three editions available:

Freeware Edition

The Freeware Edition is a good solution to get started with PRTG or for private use:

- May be used for free for personal and commercial use.
- Can monitor up to 10 sensors.
- Supports all available sensor types (except NetFlow).
- Shortest available monitoring interval is one minute.

This edition runs as default after installation when no license key is entered.

Trial Edition

The Trial Edition is intended for evaluation purposes for customers who are interested in purchasing commercial licenses:

- Can monitor up to 500 sensors.
- Supports all available sensor types (including NetFlow).
- Shortest available monitoring interval is one second.
- Temporary license key must be requested from Paessler's website.
- Trial period limited to 30-days (automatically reverts to Freeware Edition afterwards).

Free trial license keys are available on our website at http://www.paessler.com/prtg/trial

Commercial Editions

There are several different licenses of PRTG Network Monitor available to suit the demands of smaller, as well as larger customers and organizations.

- Maximum number of sensors depends on the license (100 or more).
- Supports all available sensor types (including NetFlow).
- Shortest available monitoring interval is one second.

To learn more about pricing and feature matrix or to order licenses please visit: http://www.paessler.com/order

3.3 About This Document

This document introduces the reader to the system concepts of PRTG Network Monitor and explains how to set up the software to achieve the best results. You will learn how to plan your monitoring setup, how to set up your sensors, reports, maps and user accounts.

This document does not explain each and every edit field or button of the user interface. Detailed information is included in PRTG's web interface itself in the form of short contextual help texts and hints. Also, this document is not a technical in-depth documentation of file formats, APIs and other background information. This information is available online on the Paessler knowledge base at www.paessler.com

Part IV

Basic Concepts of PRTG Network Monitor

4 Basic Concepts of PRTG Network Monitor

There are a number of basic concepts that lay the foundation for the functionality and ease of use of the PRTG Network Monitor. Please read this section carefully to make it easier for you to understand how best to use the software.

4.1 Architecture: PRTG Core Server and PRTG Probe

PRTG Network Monitor consists of two main parts:

- **PRTG Core Server**: The central part of a PRTG installation is the "Core Server" that includes the data storage, web server, report engine and notification system.
- **PRTG Probe**: A "probe" performs the actual monitoring. It receives its configuration from the Core Server, runs the monitoring processes and delivers monitoring results back to the Core Server. A Core Server can manage an unlimited number of probes in order to achieve multiple location monitoring.

Core and probe are Windows services which are run by the Windows system without the requirement for a logged-in user.

You can consider the PRTG Web Interface to be the third part. It runs on the user's web browser, seeing as it is entirely web-based. The users access the configuration and monitoring results using a standard web browser.

Additionally, there are the two administrator tools, "PRTG Server Administrator" and "PRTG Probe Administrator", to configure basic settings such as the admin login and webserver IPs.

Core Server

The Core Server is the heart of your PRTG system and contains the following processes:

- Configuration management for object monitoring.
- Management and configuration of the connected probes.
- Storage of raw monitoring results.
- Notification management including a mail server for email delivery.
- Report generator and scheduler.
- User account management.
- Data purging (culling data that is older than 365 days, for example).

The Core Server also includes a built-in, fast and secure web server (no IIS or Apache is required) that supports HTTP as well as secure HTTPS (via SSL). The Ajax-based interface is used for the configuration of devices and sensors, as well as the review of monitoring results. The web interface is highly interactive and uses Ajax to deliver a powerful and easy-to-use user experience. While the user is logged in, the data on the screen is permanently refreshed (via Ajax calls) so it always shows the current monitoring results (refresh interval and method can be set by the user). The global monitoring statistics are always shown at the top of the page, including number of sensors with an error, warning, down, paused or unusual status plus a graph showing a

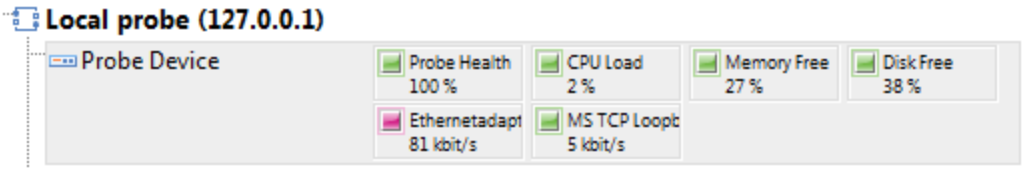
recent history of alarms, bandwidth usage, CPU usage and speed indices for all sensors.

Probes

The actual monitoring is performed by the PRTG Probe process which runs on one or more computers. During installation the so-called "Local Probe" is automatically created by the system. Additional remote probes must be created by the user (see Multiple Probes and Remote Probes). In a single-probe installation - which is the default setup - all monitoring is performed by the local probe.

After receiving their configuration from the Core system, all probes are able to work independently of the Core server for some time, e.g. in case the connection between probe and Core is lost due to connectivity problems. The probe automatically reconnects to the Core as soon as it is available again and transmits all monitoring results gathered during the connection loss, so no information is lost.

PRTG automatically monitors the "system health" of the Core server and each probe in order to discover overloading situations or badly configured systems that may distort monitoring results. To do this, the system automatically creates a number of sensors for each probe to monitor the their system status:



It is recommended to keep these sensors, but you can optionally remove all except for the "Probe Health" sensor. It measures various internal system parameters of the probe system hardware and the probe's internal processes and then computes a resulting value. Values below 100% should be investigated.

4.2 Object Hierarchy: Probes, Groups, Devices, Sensors, Channels

In PRTG Network Monitor, the actual monitoring is performed by "sensors". Each of these sensors monitors one single aspect of a network device. For example:

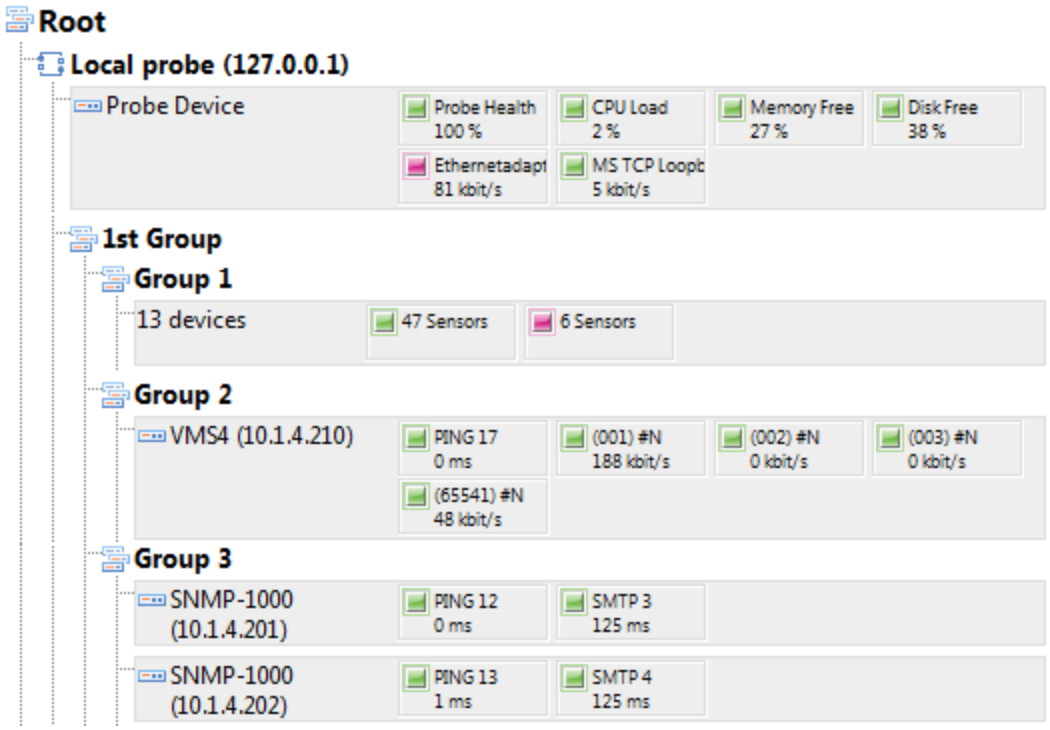
- one network service like SMTP, FTP, HTTP, etc.
- the traffic of one port or a network switch.
- the CPU or memory load of a device.
- one network card's traffic.
- one NetFlow device, etc.

Sensors are arranged in a tree-like hierarchy to create an easy to navigate list and to give the user the possibility to arrange them in groups that monitor similar devices, locations or services.

Users can create nested "groups"; each group has a number of "devices"; each device has a number of "sensors" and; finally, each sensor has one or more "channels" (e.g. IN and OUT channel, or one channel for each CPU for a multiprocessor system).

You will also see a level for "Probes" in the hierarchy. All groups/devices/sensors that are configured below a probe will be monitored via that probe (see Multiple Probes and Remote Probes).

Here is a sample configuration:



4.3 Inheritance of Settings

The hierarchical list is not only used to group sensors to organize them, there is also an important aspect involved that we call "Inheritance".

To ensure administration is quick and easy – especially for large monitoring setups - certain settings are "inherited" from the overlying level. For example, you can change the monitoring interval for all sensors by editing the interval setting of the topmost "root" group.

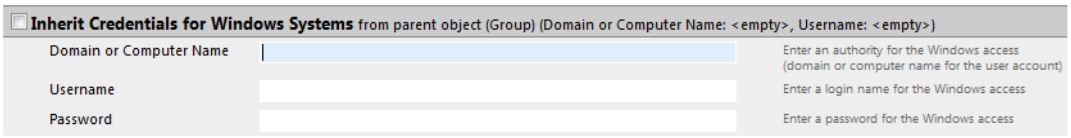
You can override this inheritance on any level of the hierarchy by setting a different value for a specific group/device/sensor. Then - again - all objects below the object that has overridden settings will inherit these settings, not the ones from the levels above.

Settings that are inherited among all objects include:

- Monitoring interval.
- Notifications.
- Windows authentication settings (e.g. for WMI sensors).
- ESX Server authentication settings (for VMware servers)
- SNMP authentication settings and compatibility settings.
- Channel and unit configuration.
- User access rights.
- Paused status: if an object is paused by the user, by a schedule or by a dependency, all associated sensors are paused as well.

There is one exception for devices and sensors: The IP address (or DNS name) of a device and the SNMP and WMI settings are always inherited by sensors and can not be changed on sensor level.

The actual overriding of the parent's settings takes place by selecting the radio button "specify settings for this (object)" on the object's settings page. This screenshot shows Windows authentication settings:



4.4 Notifications, Schedules, and Dependencies

PRTG offers the following three concepts that can help to set up a monitoring configuration.

Notifications

Whenever PRTG discovers downtime, an overloaded system, threshold breach or similar situations, it will send a "notification". Notifications use various methods by which you can be notified (e.g. email, SMS, pager message, among others). After creating notifications in the system settings, you can select them on the group, device and sensor settings pages. See Notifications for more details.

Schedules

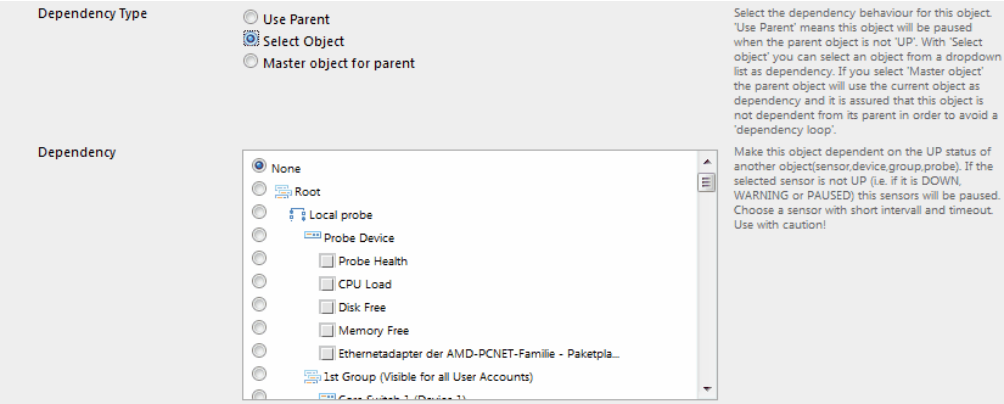
Group, device or sensor monitoring can be paused by user intervention or by a "schedule" (e.g. don't monitor Sundays between 4 and 8am). Using schedules, you can limit the monitoring time. PRTG comes with a number of pre-defined schedules that you can edit - or you can add your own schedules.

Dependencies

Using "dependencies", you can pause sensor monitoring based on the status of another sensor in order to avoid false alarms and incorrect downtime recording. A dependency stops the monitoring of one sensor or a set of sensors as soon as another specified sensor is down. This means, for example, you can stop monitoring remote network services when the corresponding firewall is down due to connection problems.

There are three options for dependencies:

- "Use Parent": By default, all objects depend on their parent object. This means that if you specify a dependency for a group and the dependency sensor goes down or is paused, all sensors in the group will be paused.
- "Select Object": To set up a dependency, go to the settings page of an object that is intended to "depend" on another object. Then select the object it shall depend on from the list:



As soon as the object you have chosen from the list enters a "red" state (goes down) or is paused, the monitoring for the dependent object (and all its child objects) will be paused and no notifications will be sent.

- "Master Object": This setting will make the sensor the so-called "Master Object" for its parent device. All sensors of the parent device will be paused whenever this Master Sensor is down. It is recommended to set a basic sensor (e.g. PING) to be the master sensor (for example, the auto-discovery sets the PING sensors for each device as the Master Objects).

4.5 Reports, Maps, and Todos

Reports

"Reports" are used to analyze monitoring data, either once or at specified intervals. You can define any number of reports, specify the sensors for a report, select a template and run them at any interval you like, such as once, daily, weekly or monthly.

Read more about reports.

Maps

Using "Maps" you can create personalized overviews and dashboards of your monitored network. A map can include a background image, such as a network drawing, and you can place status icons, lists of sensors as well as graphs with your current monitoring status on the map.

You can define any number of maps and use them to create a NOC Dashboard, an overview of the network status for your Intranet, a webpage with the graphs of your most important sensors and more. By using the Public Map feature, you can provide others with URLs to a map so they can view the data without the need for a user account.

Read more about maps.

Todos

Whenever PRTG comes across an event or monitoring object that needs the administrator's attention, it will add an entry to the "Todo list" and send an email to the admin user.

Todos are created when:

- a new device or sensor has been created by the auto discovery process and should be acknowledged by the

user.
- a new probe connects to the Core and must be acknowledged.
- a new version of the software is available.
- a new report is ready for review.
- and a few other situations, such as when the system runs out of disk space, licensing issues, etc.

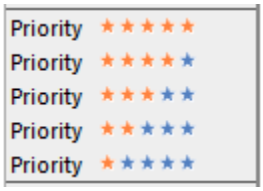
Read more about todos.

4.6 Priorities and Favorite Sensors

Priority

You can specify a priority for each object in the sensor tree, shown with 1 star ("*") for the lowest priority to 5 stars ("*****") for the highest priority. By default, PRTG sensors are sorted first by priority and then alphabetically by name in lists like "Alarms" or "Sensors".

The default priority is three stars ("***") so you can prioritize objects in your configuration quickly. Simply left click an object and select the desired setting from the context menu:



The basic idea of the priority concept is ensure that the most important sensors are always shown first in the sensors and alarms lists. This guarantees you never miss an important outage.

Favorite Sensors

Another method to highlight important sensors is to mark them as "favorite" sensors, also accessible through a sensor's context menu. A list of the favorite sensors can be found on the Dashboard page ("Home|Dashboard") and in the Sensors menu ("Sensors|Favorite").

4.7 Default Values

Default Values

For most settings, PRTG includes a set of default values which enables you to get started with the software immediately.

For example, the following settings will be inherited by all sensors from the "Root Group":

- Default monitoring interval of one minute.
- Notifications for UP and DOWN messages (email to the system admin).
- SNMP version 1 with "public" community string (default values for most devices).

- Various SNMP compatibility options.
- Various channel unit configurations.
- No schedule, no dependency, no Windows authentication account.

Additionally, these default entries are set up automatically:

- One user group (PRTG Users) that should be used for non-admin users.
- One notification (email to the system admin).
- Various web interface settings (refresh, auto folding, etc).
- A set of schedules.
- Various data purging settings.

You may need to change a number of these default entries as you become used to the interface, however, these settings should initially suffice for most situations.

Part V

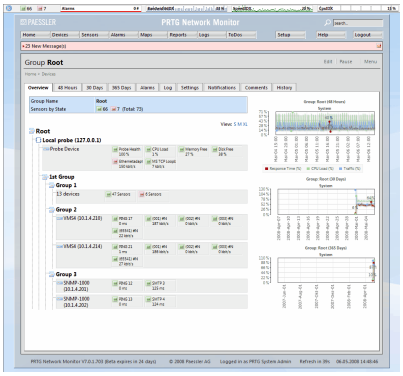
User Interfaces

5 User Interfaces

PRTG Network Monitor includes three user interface elements:

Web Based User Interface

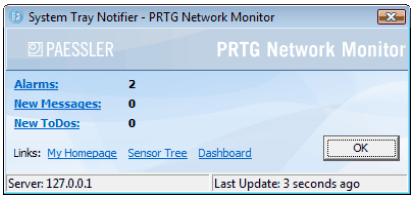
The main interface is a browser-based interface which is used to configure the software, set up sensors, review current status and create reports. Here is a screenshot:



Read more about it in sections Web Interface Navigation.

Windows Tray Tool

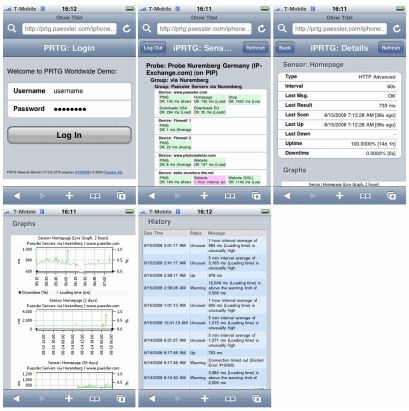
The System Tray Notifier runs on your PC in the background and will notify you with popups and sounds whenever PRTG discovers changes to your network.



Read more about the System Tray Notifier.

iPhone Interface

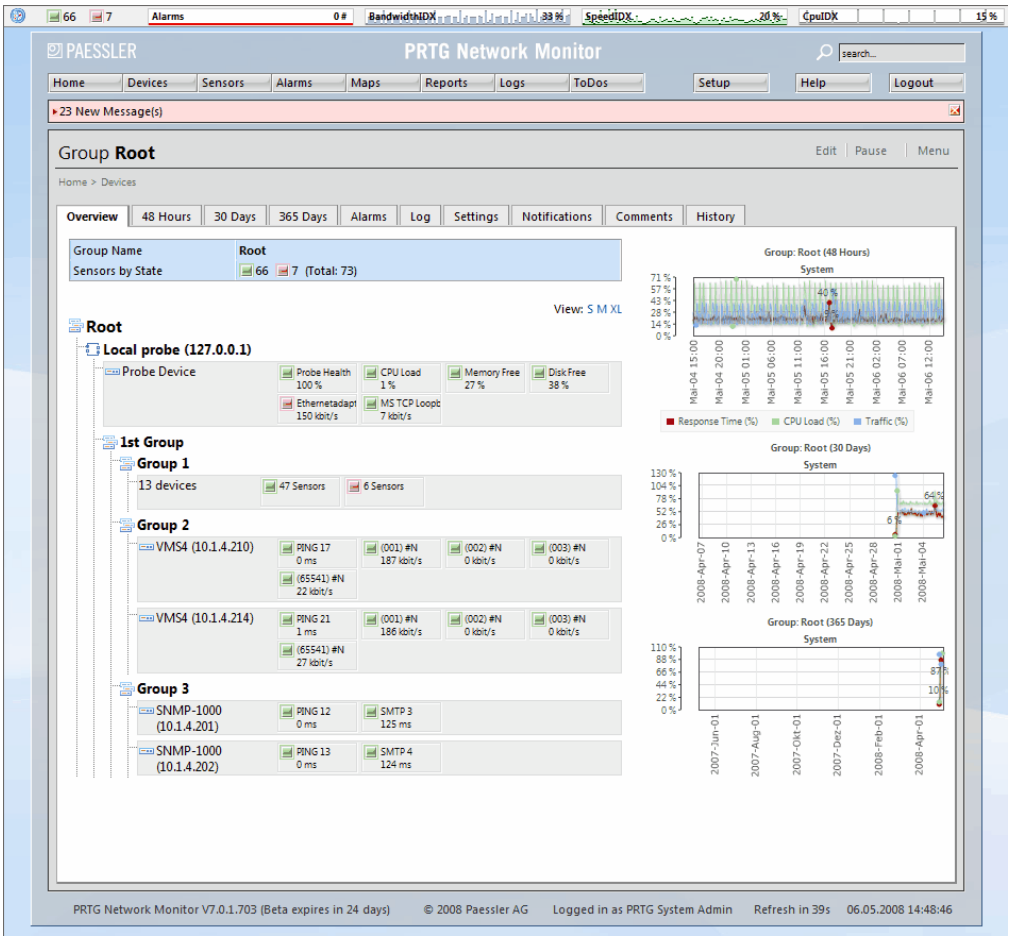
If you have an iPhone you can access a user interface that is optimized for the device:



Read more about the iPhone User Interface.

5.1 Web Interface Navigation

Please have look at this screenshot of PRTG's web interface:



The main layout consists of a status bar at the top, the header area with the main menu and quick-search box below it and, finally, the main page content (all these elements are described in the next section).

When you navigate through PRTG's web interface you will always use one of the following five navigational paths:

- The "Main Menu" provides access to many important aspects of the software
- The "Quick Search" is often the fastest way to navigate to an object
- Using the page's "Tabs" you can switch between various sub-pages for an object
- Many objects offer a "Context Menu" that will pop up when you right-click them
- And, finally, you are able to drill down into the object hierarchy of probes, groups, devices and sensors in the object tree shown above by merely clicking an object

These five navigation paths put PRTG's complete functionality at your fingertips. Quite likely you are already familiar with these techniques from many other websites and web-based user interfaces - with the exception of the context menus which are not commonly found on web-based user interfaces. However, after a short while you will understand what a powerful feature these context menus are when it comes to effectively navigating the interface.

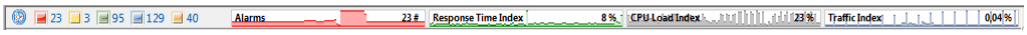
Read more here:

- Web Page Overview
- Context Menus
- Lists
- Monitoring Status Information Available Through the Web Interface

5.2 Web Page Overview

Let's have a detailed look at PRTG's webpages building blocks:

Global Status Bar

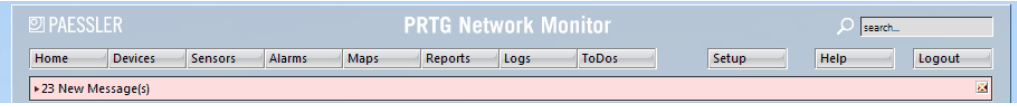


This bar is always shown above all pages. It shows the aggregated status of all sensors you have configured for monitoring. Depending on the sensors' status you will see colored squares with numbers (in the screenshot above, 23 sensors are in error (red), 3 show a warning state (yellow), 95 sensor show "OK" status (green), 129 sensors are paused (blue) and 40 sensors have an "UNUSUAL" status (orange).

The four graphs show the number of alarms as well as three "Index Graphs" for bandwidth usage, request time and CPU usage for all sensors over the last eight hours. These graphs are "index" graphs, similar to a stock index. The values are based on the readings of all sensors or a group or device and are computed by using statistical computations and by comparing the values to the highest and lowest readings ever recorded. For example, a CPU Load Index value of 90% means that the average CPU load for all CPU sensors of your current configuration lies at 90% of the highest ever measured CPU usage value.

Note: By right-clicking on the PRTG icon on the left you can access the system menu.

Website Header Area, Search Box and Main Menu

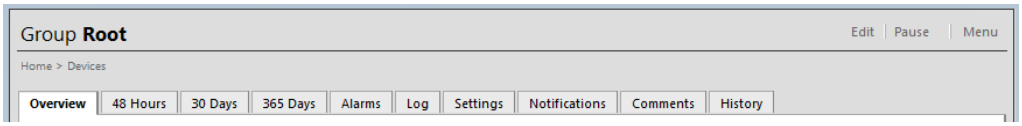


Navigating through the web interface is performed using the main menu. Please take a few minutes to familiarize yourself with all menu items and sub-items.

To search for any monitoring object, simply enter the name, part of the name, an IP address, a DNS name or a tag in the search box on the right and hit the enter key. A web page with all items that fit the search term will be returned - even displaying online help articles.

Below the menu you will see a red bar with important messages whenever PRTG discovers changes in the network or requires your attention for other reasons. Simply click the text inside the red bar to navigate to the detailed information page.

Page Header and Tabs



The individual page content starts below the website header area. Depending on the page's content you will see a menu and a few action links on the right. "Breadcrumbs" that will always show the path back to the homepage can be found below the heading.

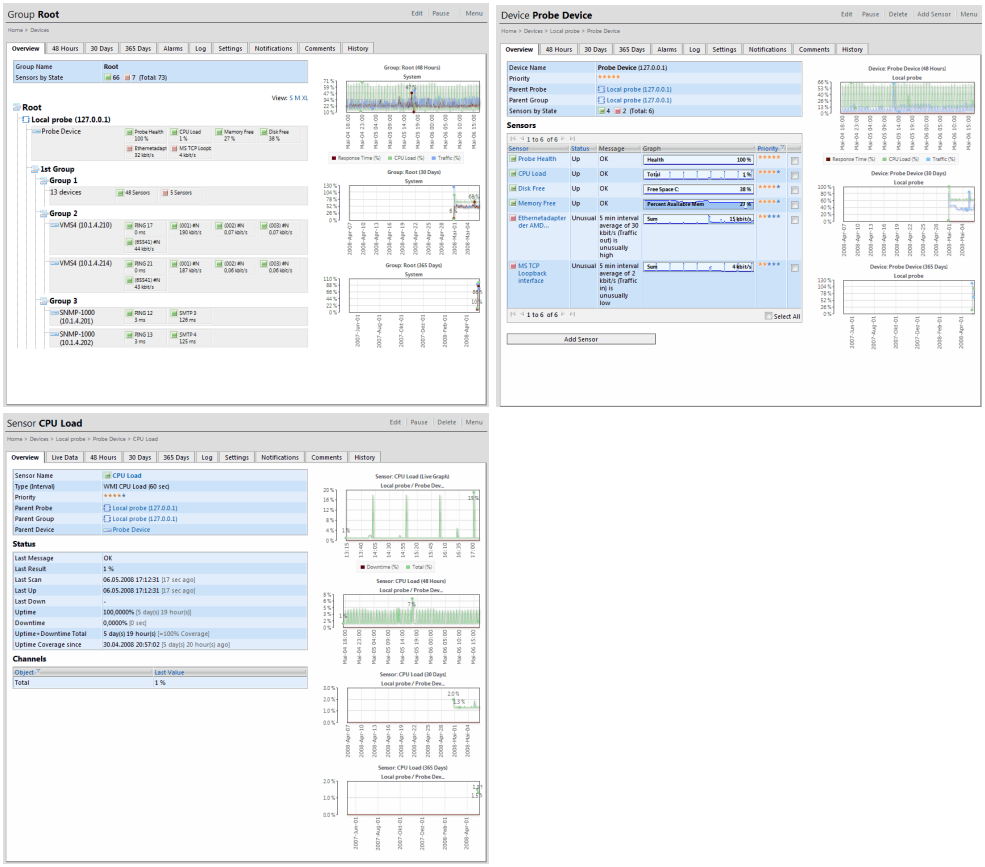
Many pages have a tab-like interface. Using these tabs you can navigate to various sub-pages for an object:

"Overview" tab	All monitoring objects offer this tab providing a quick overview of all parameters and status
"Live Data", "48 Hours", "30 Days", "365 Days" tabs	These three or four tabs show the group's, device's or sensor's historical graphs and data tables (note: live data is only available for sensors)
"Alarms" and "Log" tab	Shows a list of current alarms and historic events for an object (and its child objects)
"Settings" and "Notifications" tab	Allows you to edit an object's settings and notifications
"Comments" tab	Provides a notepad for your own comments
"History" tab	Shows a lifetime log for each object (who created it, who edited it, etc.)

Please note that you will also see other tabs for other objects.

Overview Page for Groups, Devices and Sensors

Have a look at the following three screenshots showing the "Overview" tab of a group, a device and a sensor:



You can see that all three share a common layout:

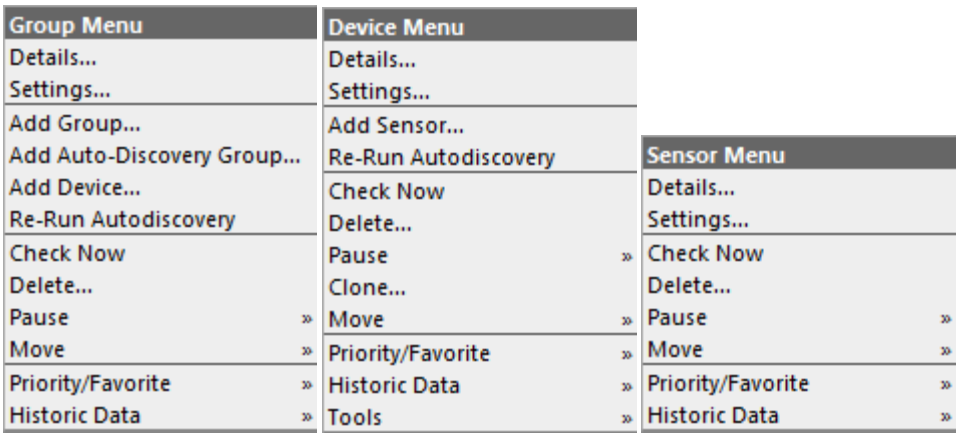
- On the upper left you have the object's name, basic settings and sensor status.
- Below that there is a list of child objects (devices for a group, sensors for a device and channels for a sensor).
- On the right there are three or four graphs showing recent history. To zoom into a graph, simply click on it (or choose the appropriate tab).

For sensors you will see four graphs that show all "channels" of the sensor for the last 48-hours, last 30 days and last 365 days plus a live graph. For groups and devices there are three graphs that show the alarms, CPU load index, traffic index and response time index (explained above) for the last 48-hours, last 30 days and last 365 days.

5.3 Context Menus

Although context menus may seem unusual for a web-based application, they are the key to user interface's ease of use. Almost all objects that appear as links in the user interface will show a context menu when your right-click them.

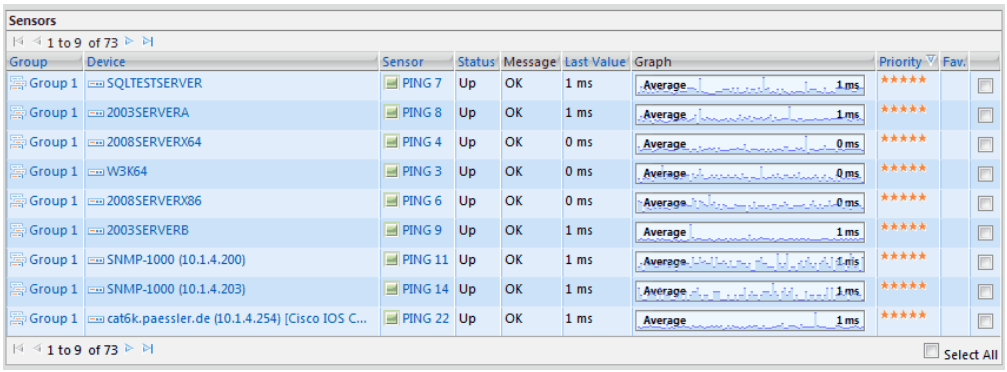
Here are three sample context menus (for group, device and sensor). They are similar to any other context menu in a Windows environment:

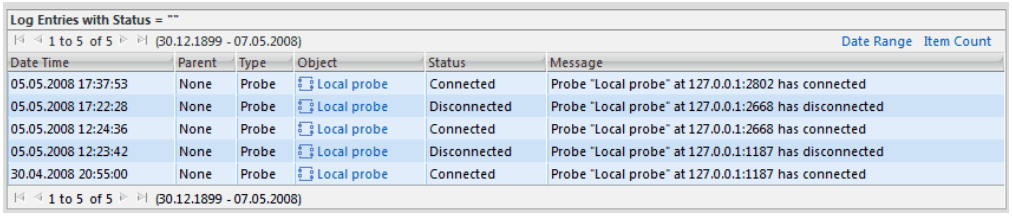


Note: If you want to access the browser's own context menu, hold the CTRL key down when right-clicking.

5.4 Lists

Throughout the web interface you will see lists of items which share common features and functions. Here are two sample lists (sensors and log entries):

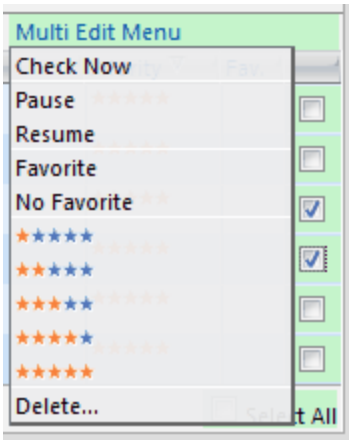




The following functions are available for lists:

- Paging: Use the small triangular icons at the top or bottom to walk through a list page by page.
- Sorting: You can re-sort a list by clicking the header of the column you want to use as sorting index.
- Date Range: When viewing log lists, you can click on "Date Range" to change the desired date range.
- Item Count: Some lists offer the possibility to change the number of entries in the list by clicking on "Item Count".

- Multi Edit: Some lists offer a column of checkboxes. As soon as you select one or more checkboxes, an additional menu will offer functions that will be applied to all items in the lists whose checkboxes have been selected. Here is a sample screenshot of this menu:



5.5 Monitoring Status Information Available Through the Web Interface

As soon as the monitoring system is running, PRTG provides a wealth of information about the current status of the system.

A sensor's status is shown by of the following messages and colors:

- OK (Green): Sensor is running well, measured values are OK.
- WARNING (Yellow): Sensor is slow or the measured value is below/above a user-defined warning threshold.
- ERROR (Red): Sensor can not be monitored (e.g. device is down) or the measured value is below/above a user-defined error threshold.
- PAUSED (Blue): Sensor has been paused by the user or due to a dependency or schedule.
- UNUSUAL (Orange): Sensor is running well but recent values are unusually high or low (PRTG calculates this by applying statistical analysis on the recent measurements and the historic data of a sensor).
- UNKNOWN (black): Sensor has not been checked recently, e.g. shortly after starting the program or when the associated probe is unavailable.

The web interface provides in-depth information for each sensor:

- 4 graphs (live data, last two hours, last 48-hours, last 30 days, last 365 days).
- 4 data tables (one for each graph).
- Current status and error message (if available).
- Last measured value for each channel.
- Aggregated uptime and downtime.
- Last good request, last failed request.
- Coverage (% of time monitoring information is available)
- Sensor’s editing history (which user has changed what settings).
- Sensor activity log.
- User comments.

Current sensor and device status can be reviewed in numerous ways:

- "Sensor Tree": a hierarchical view with a tree-like display of all groups, devices and sensors.
- "Lists": various lists of sensors.
- "Alarms": a list of all sensors showing an error state, a warning state or unusual values.
- "Dashboard": a quick overview of the most important lists (alarms, recent log entries, favorite sensors status, recent todos).
- "Maps": You can create your own overviews and dashboards for your monitored network.

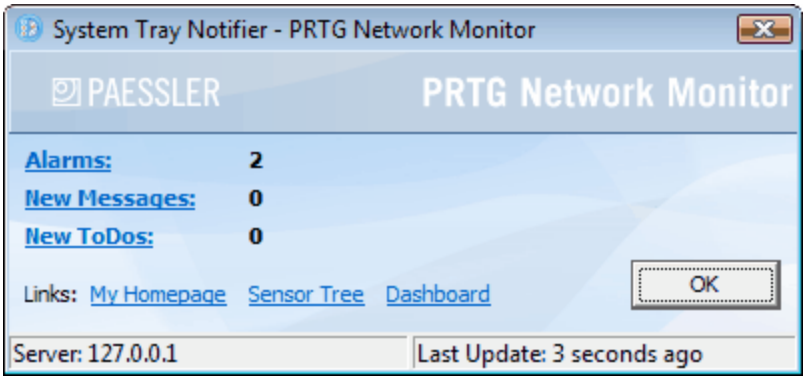
You can review the status of sorted sensors and filtered lists based on various parameters (e.g. sensor type, tag, device, status, measured value, etc).

- Various Top 10 lists.
- Best/worst availability.
- Fastest/slowest PING.
- Highest/lowest bandwidth usage.
- Fastest/slowest website.
- Highest/lowest CPU usage.
- Highest/lowest available disk space.

Graphs for groups and devices show the alarms, a "bandwidth index", "speed index" and a "CPU load index" for the associated sensors. These values are calculated using a sophisticated algorithm that merges the data of various sensor types into one graph showing a rough overview of how the sensors of the group/device behaved recently. These graphs are quite helpful to discern unusual network behavior.

5.6 System Tray Notifier

The System Tray Notifier runs on your PC in the background and will notify you with popups and sounds whenever PRTG discovers changes in your network.

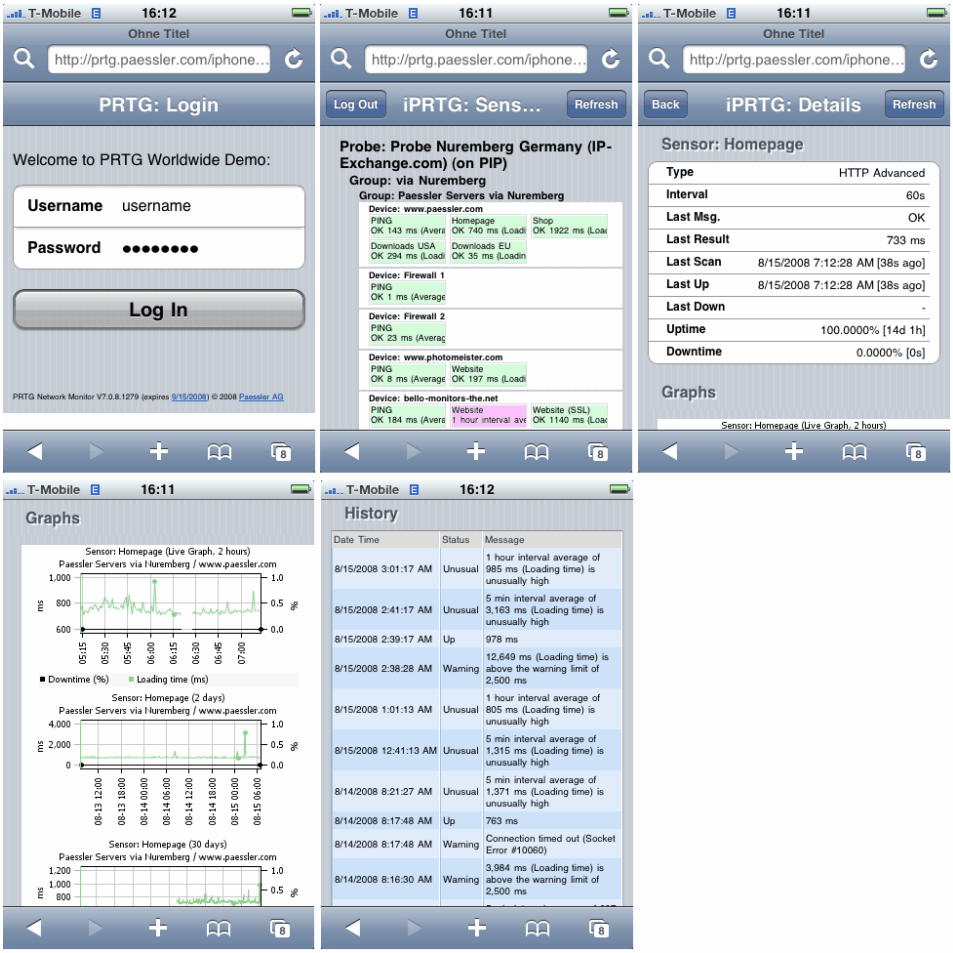


It is automatically installed on the computer where you have installed PRTG. To use the Tray Tool on other computers, simply download and install the software from PRTG's web interface (select menu item "Setup| Downloads").

Start the software and you will see a PRTG icon in the Windows System Tray in the lower right corner of your screen. To configure the software, please right click the icon and choose "Options". Enter your account credentials and the DNS name of your PRTG server. The program will now run in the background and will show a popup, play a sound or show a blinking tray icon to notify you about alarms, messages or todos.

5.7 iPhone User Interface

PRTG Network Monitor offers a user interface that is optimized for the Apple iPhone. This feature enables the user to quickly check the status of the servers and sensors remotely. It looks like this:



Simply point the Safari browser of your iPhone to the URL https://(your_prtg_server)/iphone and you will see the login dialog. Enter your credentials and a few seconds later you will see the sensor tree with groups, devices and sensors on the iPhone display. Tap on a sensor and you will receive a display with detailed information about the sensor, recent graphs logfile entries.

Currently the iPhone interface is "read only" (you can only monitor status). More features and functions will be added soon.

Please keep the following security aspects in mind:

- You could also use HTTP to connect to your server, but encrypted access with SSL/HTTPS is recommended in order to keep your password secure.
- As an added level of security you could create a user just for your iPhone logins that only has read access for the “Root Group” or for selected groups that you want to monitor remotely (in case you have more than a few sensors).

Part VI

Sensor Setup

6 Sensor Setup

Before starting to create sensors, review the "Root Group's" settings that will be inherited by all other objects (see Setting Base Settings for Your Network).

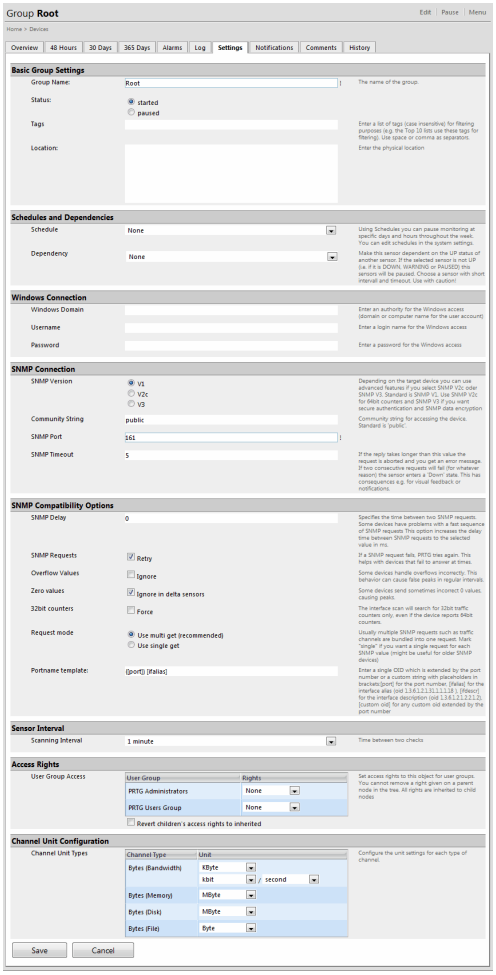
As soon as this step is completed you can start to create new sensors to monitor your network. This can be done either manually or automatically using the Auto Discovery. The following sections explain these steps.

Note: If you want to create a multi-probe setup, you need to add and configure the necessary probes first (see Multiple Probes and Remote Probes).

6.1 Reviewing Settings of the Root Group

Objects in the sensor tree inherit many settings from their parent objects as explained in the Inheritance section. Obviously, the "Root Group", which is the parent object to all other objects, is especially important in this regard.

So, before you create your own sensors, it is a good idea to review the Root Group's settings to ensure they suit your network. Choose the "Devices" item from the main menu and click the "settings" tab. There are several relevant settings:



Please review the settings and refer to the help texts on the right for detailed explanations for each of them. Remember that you can override these settings for all child objects later.

You should note the "Windows Connection", "SNMP Connection", and "interval" settings:

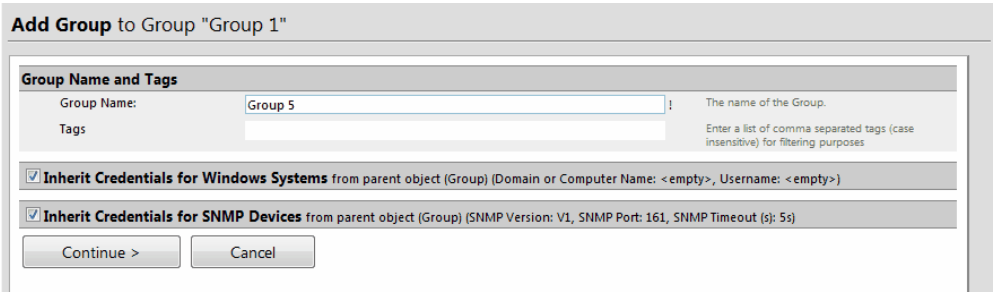
- Windows Connection: The Active Directory user account provided here will be used for all WMI-based monitoring and during the Auto Discovery process. It is recommended to enter a user account with administrator privileges.
- SNMP Connection: Please select the SNMP version and enter the necessary authentication strings used in your network. The defaults are "SNMPV1", community string "public" and port 161.
- Interval: Please select the default interval that shall be used for monitoring by all sensors.

6.2 Creating Groups, Devices and Sensors Manually

Creating Groups

To create new groups go to the devices list ("Devices" under the main menu) and either choose a probe or group that is intended to contain the new group. Right click the object and then choose "Add Group" from the context

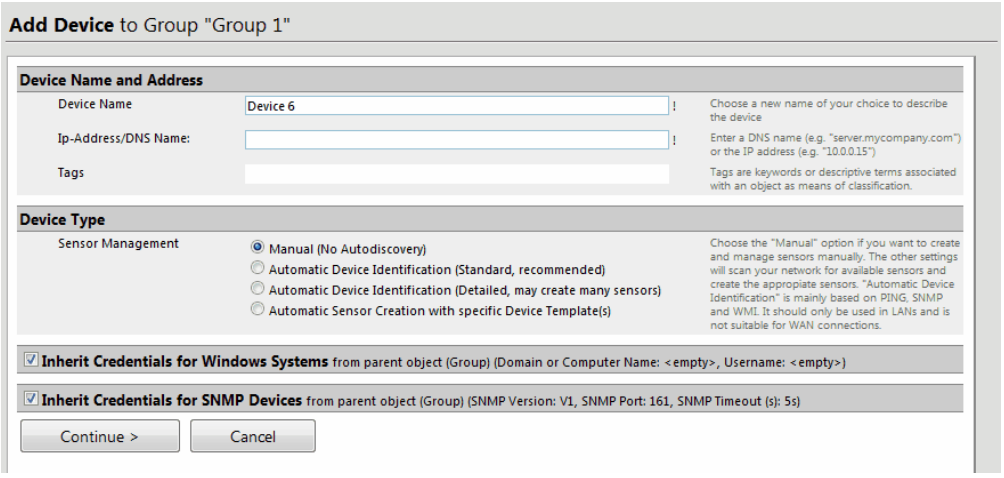
menu.



Enter a name for the new group, optionally review the Windows and SNMP connection settings and then click "Continue".

Creating Devices

To create a new device, right-click a device and select "Add Device" from the context menu.

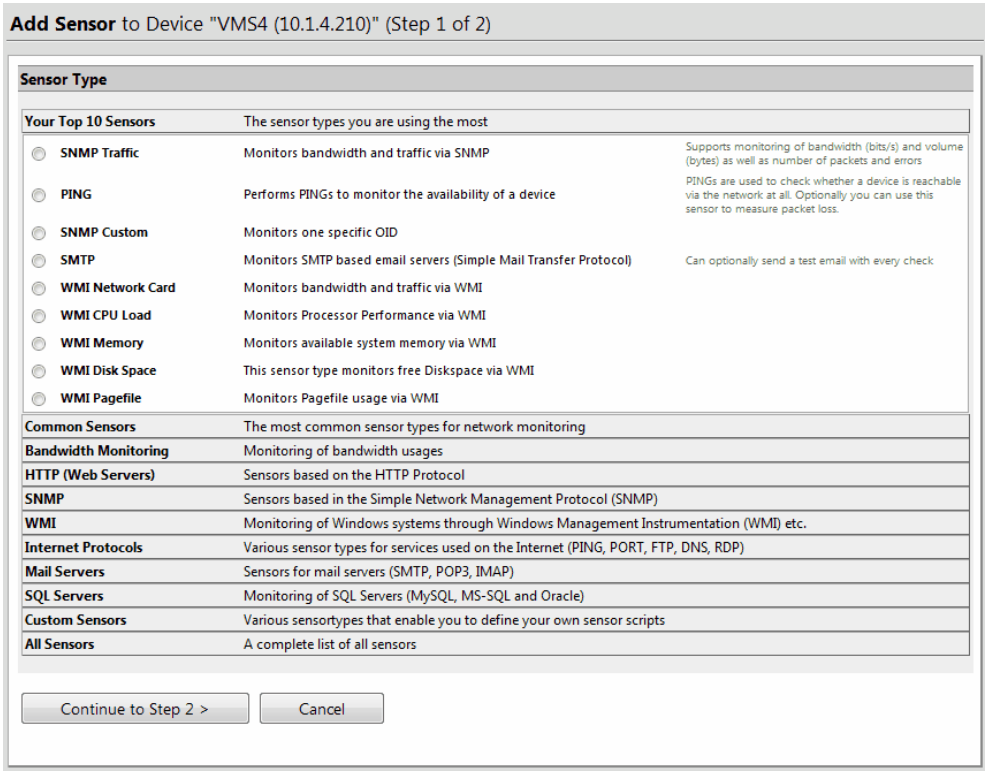


There are two settings that you must enter for a device: The name and the IP address (or DNS name). Optionally, review the Windows and SNMP connection settings and then click "Continue".

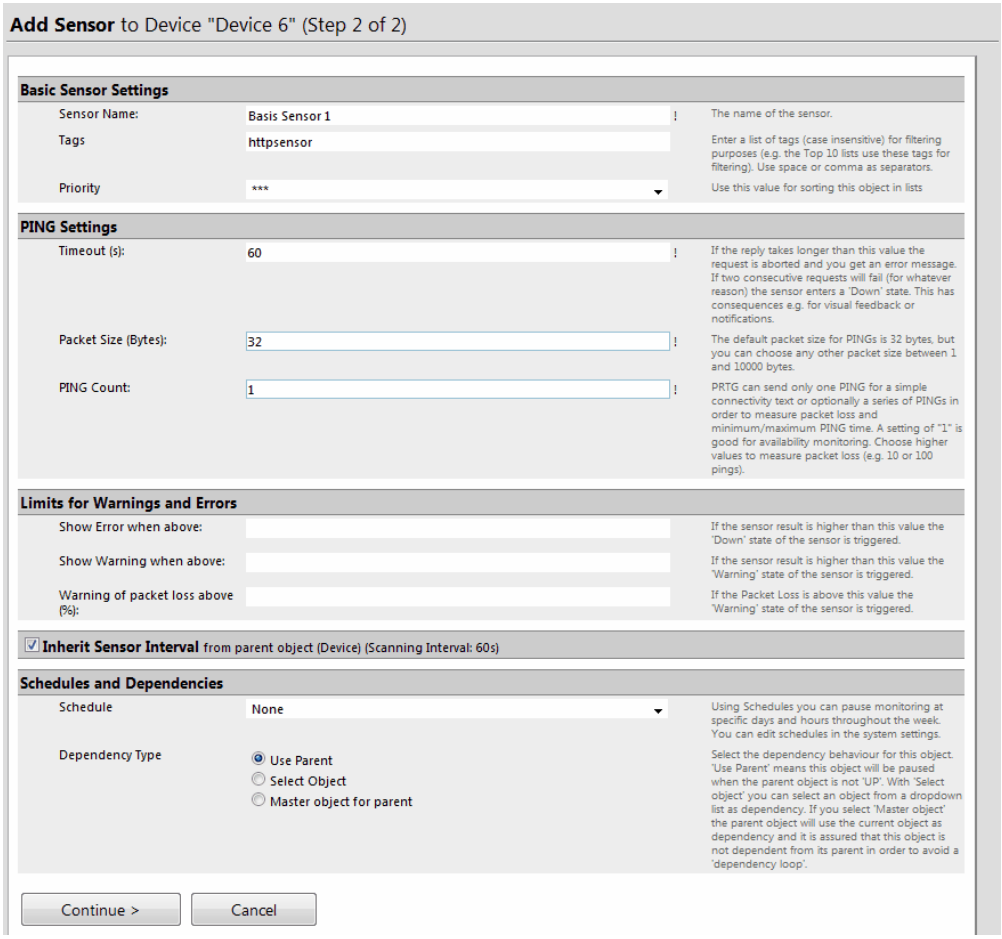
Creating Sensors

In order to create new sensors, right-click on the device where the new sensor is to be added and choose "Add Sensor" from the context menu.

Creating new sensors involves two steps: First, you must select a sensor type, then - after some preparations by PRTG - you need to specify the sensor settings.



In step one you must select a sensor type from the available types list. There are more than 30 different types (see Sensor Types for detailed descriptions), so PRTG offers various groupings. Simply click one of the group headings and then select a sensor type. Then click "Continue to Step 2".



In step two the settings available depend on the sensor type. Please review the settings and make any necessary changes, then click "save". The new sensor will start monitoring right away.

6.3 Creating Devices and Sensors Using the Auto Discovery

PRTG's Auto Discovery is a great way to automatically create a sophisticated and concise set of sensors for your complete network. It is mainly suitable for LAN discovery since it involves a lot of SNMP and WMI.

How it works

PRTG's Auto Discovery process has three stages:

1. Step: Scanning a network segment for devices using PINGs (for groups only).
2. Step: Assessing the device type for all devices discovered in Step 1 (using SNMP, WMI and other protocols).
3. Step: Creating sensor sets that match the discovered device types of Step 2 (based on built-in device templates with recommended sensors for many device types).

The Auto Discovery can be used on a group level for a range of IP addresses, or for individual devices you might have created manually. It can be run just once, on demand via the context menu, or scheduled every hour, day or

week. Running the Auto Discovery every day or week will automatically create new sensors when new devices are connected to the network (regardless of being authorized or not). As soon as new devices or sensors are discovered, new "todos" are created and mailed to the system admin.

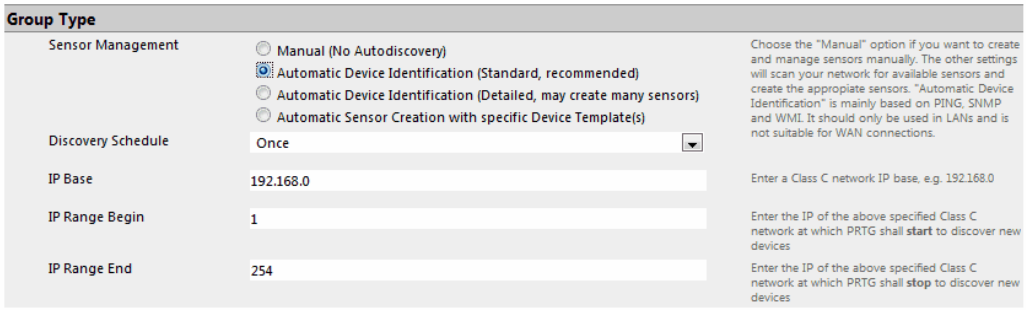
There are some restrictions in place, in order to successfully use the Auto Discovery:

- PRTG can not discover devices that can not be pinged since Step 1 uses PINGs (e.g. if a firewall blocks echo requests).
- You must supply authentication settings for SNMP and Windows/WMI in order to fully exploit the power of this feature.
- If a device has more than one IP address, it may show up more than once in the discovery results, even though PRTG tries to identify these situations.

Creating an Auto Discovery Group

Create a new group by right-clicking a probe, or group, and selecting "Add Auto-Discovery Group" from the context menu.

Enter a name for the group and choose the desired option for the "Sensor Management" setting:

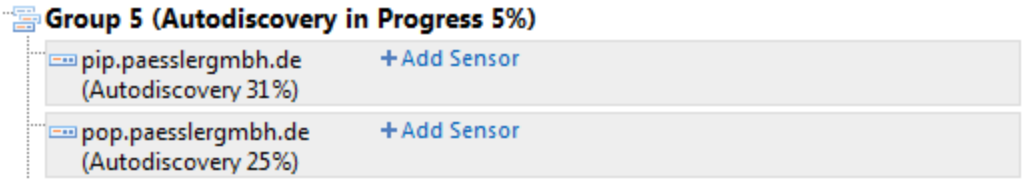


You have four options:

- Manual (No Autodiscovery)
- Automatic Device Identification (Standard, recommended): This recommended option and should work fine for most installations.
- Automatic Device Identification (Detailed, may create many sensors): This option is only suitable for small network segments and whenever you want to monitor the maximum number of sensors available.
- Automatic Sensor Creation with specific Device Template(s): Choose this option if you do not want automatic device identification and would rather select the device templates manually. You will see a list of device templates from which you can select one or more templates.

Afterwards, enter the IP Base (the first 3 bytes of the IP Range) and the first and last 4th byte of the IP address range.

As soon as you click on "continue", PRTG will start the discovery process, visible in the sensor tree ("Devices" menu item of the main menu):

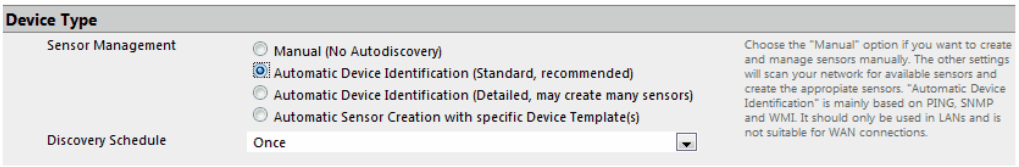


If you keep looking at this page, you will see more and more devices and sensors showing up in the list. The Auto Discovery process can take anywhere from 0.1 to 0.8 minutes per IP address, depending on the configuration and the network.

All sensors created by this process will start monitoring immediately and will notify failures as soon as they happen.

Creating an Auto Discovery Device

Creating sensors for just one device using the Auto Discovery function is quite similar to creating an auto discovery group. Create a new device by right-clicking a group and choosing "Add Device" from the context menu.



Enter a name and IP address (or DNS name) for the device and choose one of the options for "Sensor Management" (described above).

As soon as you click "Continue" the device assessment will begin and create the sensors that suit the device.

Part VII

Sensor Types

7 Sensor Types

PRTG offers more than 30 different sensor types for various network services. All sensor types have a number of type-specific settings plus there are a number of common settings for all sensors. Please refer to the help text in the web interface for a detailed description of all other settings.

Overview of Sensors

When creating new sensors you will see the following groups of sensor types. Note that some sensor types will show up several times in this list because they fit into more than one catergory

- Common Sensors: The most common sensor types for network monitoring
- Bandwidth Monitoring: Monitoring of bandwidth usages
- HTTP (Web Servers): Sensors based on the HTTP Protocol
- SNMP: Sensors based in the Simple Network Management Protocol (SNMP)
- WMI: Monitoring of Windows systems through Windows Management Instrumentation (WMI) etc.
- Internet Protocols: Various sensor types for services used on the Internet (PING, PORT, FTP, DNS, RDP)
- Mail Servers: Sensors for mail servers (SMTP, POP3, IMAP)
- SQL Servers: Monitoring of SQL Servers (MySQL, MS-SQL and Oracle)
- File Servers: Monitoring of File Servers, NASs, etc.
- VMware Servers: Sensors for VMware ESX Servers
- Custom Sensors: Various sensortypes that enable you to define your own sensor scripts

7.1 SNMP Sensors Types

The Simple Network Management Protocol (SNMP) is the most basic method of gathering bandwidth and network usage data.

How SNMP Monitoring works

It can be used to monitor bandwidth usage of routers and switches on a port-by-port basis, as well as device readings such as memory, CPU load, etc.

When this technology is used, PRTG queries the devices (e.g. routers, switches and servers) for the traffic counters of each port with quite small data packets. These are triggering reply packets from the device. Of the three methods, this option creates the least CPU and network load.

Reasons To Choose SNMP Monitoring

SNMP is the most commonly used method mainly because it is easy to set up and requires minimal bandwidth and CPU cycles. If your network devices support SNMP, and/or if you want to monitor large networks with several hundred or thousands of sensors, we recommend you start with SNMP.

Besides network usage monitoring, another well-known feature of SNMP is the ability to also watch other network parameters such as CPU loads, disk usage, temperatures, as well monitoring many other readings (depending on the device).

Network issues: In order to use SNMP for monitoring purposes, it is imperative that UDP packets are allowed to travel from the machine running PRTG, to the device you want to monitor and back, which is usually the case in LANs and Intranets. This is not usually the case for Internet connections, DMZ and WAN connections and some changes to the traversed firewalls may be necessary. Keep in mind that SNMP V1 and V2c are not secure protocols and should not be used across the Internet or insecure data connections. Only SNMP version 3 supports encryption.

SNMP Sensors Types

The following sensors use the Simple Network Management Protocol (supports SNMP V1, V2c and V3):

- SNMP Traffic: Supports monitoring bandwidth (bits/s) and volume (bytes), as well as the number of packets and errors via SNMP for a port or a network card on PCs, servers, switches, firewalls, printers.
- SNMP Custom: Monitors one specific OID supplied by the user.
- SNMP Helper: SNMP Helper enables you to monitor thousands of performance counters on Windows systems (SNMP Helper agent must be installed on the device, see SNMP Helper).
- SNMP Library: SNMP libraries make it easy to create system-specific sensors based on MIBs (some are included and new ones can be created from standard SNMP MIB files using the free MIB importer tool, see below).

SNMP Version 1, 2c and 3

PRTG supports three versions of the SNMP protocol:

SNMP Version 1: The oldest and most basic version of SNMP

- Pros: Supported by most SNMP-compatible devices; simple to set up.
- Cons: Limited security as it only uses a simple password (“community string”) and data is sent in clear text (unencrypted); should only be used inside LANs behind firewalls, not in WANs; only supports 32-bit counters which is not enough for high-load bandwidth monitoring (gigabits/second).

SNMP Version 2c: Adds 64-bit counters

- Pros: Supports 64-bit counters to monitor bandwidth usage in networks with gigabits/second loads.
- Cons: Limited security (same as with SNMP V1).

SNMP Version 3: Adds authentication and encryption

- Pros: Offers user accounts and authentication for multiple users and optional data packet encryption,

increasing available security; plus all advantages of Version 2c.
- Cons: difficult to configure.

It is important to know that if you select an SNMP version which is not supported by the server or device you want to monitor, you will receive an error message. Unfortunately, most of the time these error messages do not explicitly mention the possibility of using the incorrect SNMP version. These messages provide minimum information such as “cannot connect” or similar. The same situation exists if community strings, usernames and passwords are incorrect.

What is the “SNMP Community String”?

The “SNMP Community String” is similar to a user ID or password that allows access to a router's, or other device's, statistics. PRTG Network Monitor forwards the community string along with all SNMP requests. If the correct community string is provided, the device responds with the requested information. If the community string is incorrect, the device simply discards the request and does not respond. **Note:** SNMP community strings are only used by devices that support SNMPv1 and SNMPv2c protocols. SNMPv3 uses username/password authentication, along with an encryption key.

By convention, most SNMPv1-v2c equipment ships with a read-only community string set to "public". It is standard practice for network managers to change all the community strings to customized values within the device setup.

Tools

Paessler MIB Importer: Imports MIB (Management Information Base) files and converts them into OID libraries for use with PRTG Network Monitor.
http://www.paessler.com/tools/

Paessler SNMP Tester: SNMP Tester can run simple SNMP requests against a device in a network to debug SNMP requests down to the protocol level in order to find communication and/or data problems in SNMP monitoring configurations.
http://www.paessler.com/tools/

See also

Bandwidth Monitoring Sensor Type Comparison

7.2 WMI Sensors Types

Windows Management Instrumentation (WMI) is the base technology from Microsoft for monitoring and managing Windows-based systems. WMI allows access to data for many Windows configuration parameters, as well as current system status values. Access can be local or remote via a network connection. WMI is based on COM and DCOM and is integrated in Windows 2000, XP, 2003 and Vista (add-ons are available for Windows 9x and NT4).

In order to be able to monitor remote machines, PRTG's WMI sensor needs an Active Directory account to have access to the WMI interface. You can enter these credentials for the parent device or group. The sensor will then inherit these settings.

WMI Sensor Types

PRTG supports the following WMI based sensor types:

- WMI CPU Load: Measures CPU load of a system (total and per CPU).
- WMI Memory: Displays free system memory (MB and %).
- WMI Disk Space: Free disk space on fixed drives (MB and %, per drive).
- WMI Network Card: Measures traffic going through network cards.
- WMI Page File: Checks the usage of the Windows page file.
- WMI Service: Checks if a service is running and optionally restarts a service if it is not running.
- WMI Event Log Sensor: Monitors a system's application, system and security event log for specific events.
- WMI Process: Monitors one process via WMI.
- WMI File: Monitors file size and existence, as well as changes to a file via WMI.
- WMI Query: Performs a custom WMI query.
- WMI Vital System Data: Users can select from more than 20 different vital Windows System parameters (CPU: Percent Processor Time, CPU: Processor Queue Length, CPU: Processor Percent Privileged Time, CPU: Processor Percent User Time, Thread Context Switches, Memory: Free Physical Memory, Memory: Total Visible Memory, Memory: Pages/sec, Memory: Page Faults/sec, Memory: Page Reads/sec, Memory: Page Writes/sec, Memory: Pool Non-paged bytes, Pagefile Usage, Disk: Percent Disk Time, Disk: Current Disk Queue Length, Disk: Reads/sec, Disk: Writes/sec, Network: Bytes Total/sec, Network: Bytes Received/sec, Network: Bytes Sent/sec, Server: Bytes Total/sec, Server: Bytes Received/sec, Server: Bytes Sent/sec, etc).
- WMI Exchange Server 2003: Monitors vital readings of an Exchange Server 2003.

Links to WMI related articles

Paessler WMI Tester - A practical freeware tool to test WMI connections. Tests the accessibility of WMI (Windows Management Instrumentation) counters in a quick and easy manner.
http://www.paessler.com/tools/wmitester

Microsoft: Windows Management Instrumentation Technical Articles: Managing Windows with WMI
http://msdn2.microsoft.com/en-us/library/ms811533.aspx

Microsoft: WMI Reference
http://msdn.microsoft.com/en-us/library/aa394572.aspx

See also

Bandwidth Monitoring Sensor Type Comparison

7.3 HTTP Sensor Types

The HTTP protocol (Hypertext Transfer Protocol) is most commonly used for the World Wide Web. Web browsers request web pages, graphics, etc from web servers using this protocol.

Common Parameters include:

- URL— the URL address of the web page to monitor (including the leading http://).
- Mode — the HTTP request mode to use (GET, POST, HEAD).
- POSTDATA — the data part when using the POST method.

For simple web pages, simply enter the URL (with http:// at the beginning) and keep the default mode selection of GET. If you want to monitor a URL for a POST form, you must select the POST method and enter the POSTDATA. The HEAD method only requests the HTTP header from the server without the actual web page. Although this saves bandwidth since less data is transferred, it is not recommended because the measured request time is not the one experienced by your users and you might not be notified for slow results or timeouts.

Note: If your network requires a proxy for HTTP requests or the URL requires authentication, you must use the HTTP Advanced Sensor.

Bandwidth Issues and Log File Analysis Issues

Important: Keep in mind that the HTTP sensor can create substantial bandwidth load since it is one of the sensors that transfers many bytes per requests (sometimes 1000 times more that a simple ping). So, choosing a URL that only provides a small HTML page in return is recommended if you have to pay for the bandwidth (either for your connection or for your web server). This is certainly not a major problem in most LANs and Intranets, but bandwidth usage should always be monitored. Requesting a 25kb web page with an interval of one minute creates a traffic of 36MB per day or more than one Gigabyte per month.

Also, keep in mind that the monitoring requests will show up in your web server log analysis (one month of monitoring with a one minute interval will create 43,200 requests). You should filter out the requests from PRTG when analyzing log files. Filtering can be done based on the IP address of the server running PRTG or by filtering requests from PRTG's browser agent:

```
Mozilla/5.0 (compatible; PRTG Network Monitor Vxxxx; Windows)
```

HTTP Sensor Types

PRTG offers the following HTTP-based sensors to monitor web servers:

- HTTP: Monitors a web server via the HTTP protocol.
- HTTP Advanced: Monitors a web server via the HTTP protocol with various advanced settings (e.g. to check the content of a web page or to use authentication or a proxy server).
- HTTP Transaction: Monitors a web server using a set of URLs to monitor whether logins or shopping carts are working fine. You must supply a series of URLs (GET and/or POST requests) including the parameters to monitor a transaction. Use the Paessler URL Recorder to build such a URL list (see below).
- HTTP Content: Monitors a return value provided by a HTTP request. This sensor requests a HTTP URL and parses the result for a value enclosed in brackets "[value]". The most common use is to monitor a particular value inside a web server for validity. For example if you have a script or CGI running on the web server that merely publishes the free disk space of the server's hard disk or the current processor usage you can actually monitor this value. Of course many other usage concepts are possible.

All sensors support HTTP and HTTPS.

What it means when the HTTP sensor is up

The UP status of an HTTP sensor means that the web server delivers an HTTP result that is correct according to the HTTP protocol and that the URL is available. This means that the web server software is up and running but you do not know whether the results are correct, e.g. the webpage can contain error messages. So you don't know whether the CGI scripts, etc, are working correctly or whether, for example, the database of the web server is ok. It is recommended to also check the content of a web page by using the HTTP Advanced Sensor, instead of the simple HTTP sensor, for added reliability.

What it means when the HTTP sensor is down

There are numerous reasons for an HTTP sensor to fail. Besides normal connectivity problems, the most common problems are internal server errors (error code 50x) and problems caused by an incorrect URL (error code 404, page not found).

Tools

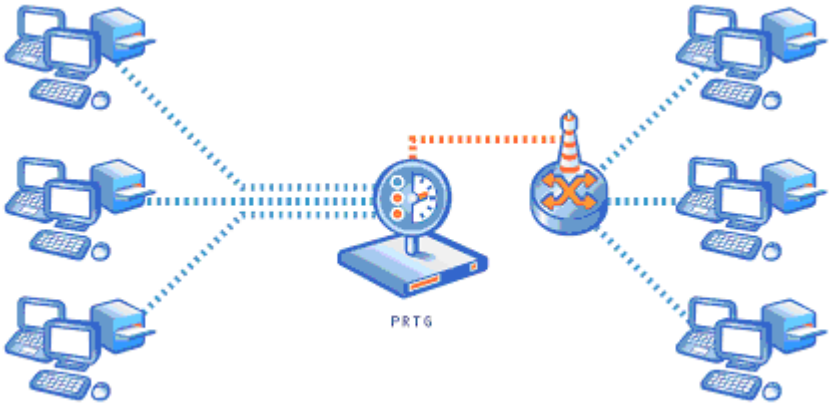
Paessler URL Recorder: Find out the URLs and the POSTDATA strings that a user sends to a web server while surfing a sequence of URLs - useful when setting up HTTP Transaction sensors
http://www.paessler.com/tools/

7.4 Packet Sniffing Sensor Types

Packet Sniffing should come into consideration if your network device(s) do not support SNMP or if you need to differentiate the bandwidth usage by network protocol and/or IP addresses.

How Packet Sniffing works

If you need to know what applications or IP addresses are causing the traffic in your network, you can use a packet sniffer. This will look at every single data packet traveling through your network for accounting purposes.



PRTG can analyze the packets passing the network card of a PC or it can be connected to the so-called monitoring port of a switch. In order to calculate bandwidth usage, PRTG inspects all network data packets either passing the PC's network card (shown on the left side) or the data packets sent by a monitoring port of a switch (right side) with its built-in packet sniffer.

Comparing the four bandwidth monitoring technologies provided by PRTG (SNMP, WMI, NetFlow and Packet Sniffing) this one creates the most CPU and network load and should thus only be used in small to medium networks, on dedicated computers for larger networks or for individual computers.

Reasons To Choose Packet Sniffing

It is important to understand that the packet sniffer can only access and inspect data packets that actually flow through the network interface(s) of the machine running the PRTG software. This is fine if you only want to monitor the traffic of this machine (e.g. your web server). In switched networks, only the traffic for a specific machine is sent to each machine's network card, so PRTG can usually not discern the traffic of the other machines in the network.

If you also want to monitor the traffic of other devices in your network, you must use a switch that offers a "monitoring port" or "port mirroring" configuration (Cisco calls it "SPAN"). In this case the switch sends a copy of all data packets traveling through the switch to the monitoring port. As soon as you connect, the PRTG host machine connected to the port monitored by the packet sniffer is able to analyze the complete traffic that passes through the switch. Another option is to use the PC running PRTG as a gateway for all other computers.

Header Based vs. Content Based Packet Sniffing

PRTG provides two base technologies for packet sniffing:

- Header based: PRTG looks at the IPs and ports of source and destination to assess the protocol. This is very fast but, at times, not very accurate. For example it is not possible to identify HTTP traffic on ports other than 80, 8080, and 443 as HTTP.
- Content based: PRTG captures the TCP packets, reassembles the data streams and then analyzes the content of the data using an internal set of rules to identify the type of traffic. This is quite accurate (e.g. HTTP traffic on any port number is accounted for as HTTP) but requires much more CPU and memory resources, especially when a lot of traffic passes the network card.

Header based sniffing is much faster but the accounting is less reliable (e.g. HTTP packets on non-standard ports are not accounted as HTTP traffic). Content based sniffing is quite accurate, but creates more CPU load.

Packet sniffing can differentiate between the following protocols:

- WWW Traffic: HTTP, HTTPS
- File Transfer: FTP
- Mail Traffic: IMAP, POP3, SMTP
- Chat, Instant Messaging: IRC, AIM
- Remote Control: RDP, SSH, Telnet, VNC
- Network Services: DHCP, DNS, Ident, ICMP, SNMP
- NetBIOS: NETBIOS
- Various: Socks, OtherUDP, OtherTCP

Packet Sniffing Sensor Types

PRTG offers three sensor types that are based on Packet Sniffing:

- Packet Sniffer (Header): Looks at the headers of the data packets to account traffic by IP, by port, by protocol, etc.
- Packet Sniffer (Content): Reassembles data packets to streams and looks into the payload data of the streams to assess the type of traffic (e.g. SMTP, HTTP, IMAP, file sharing, NETBIOS, etc.)
- Packet Sniffer (Custom): Accounts for data packets using user-specific rules (header based).

In the sensor settings you can choose how detailed you want traffic to be accounted for according to the protocols used. You can also include and exclude filters that allow monitoring of specific packets, IPs, Ports, etc.

Tools

Paessler Card Packet Counter: Shows short term statistics about the network data packets passing a local network card.
http://www.paessler.com/tools/

See also

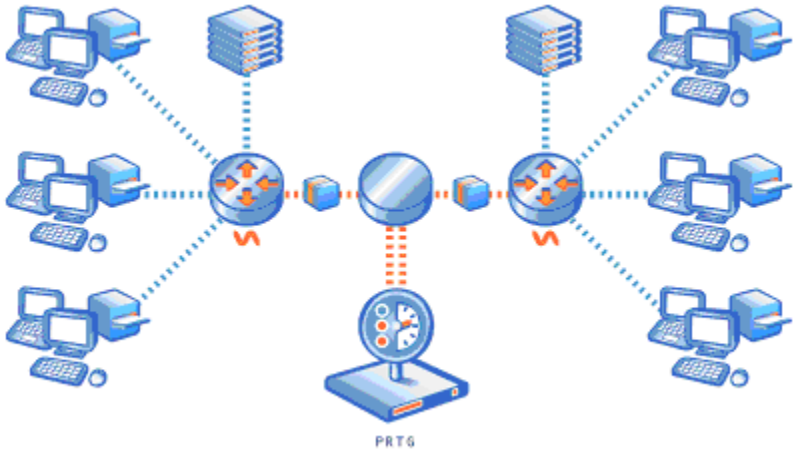
Bandwidth Monitoring Sensor Type Comparison

7.5 NetFlow Sensor Types

NetFlow monitoring is the domain of networks using Cisco switches.

How NetFlow Monitoring works

One option to measure bandwidth usage "by IP address" or "by application" is to use Cisco's NetFlow protocol which is specially suited for high traffic networks. Many Cisco routers and switches support this protocol.



Cisco devices with NetFlow support track the bandwidth usage of the network internally and merely forward pre-aggregated data to the PRTG system for accounting purposes. This way PRTG's computing load is much lower. This option is recommended for high traffic networks.

Reasons To Choose NetFlow Monitoring

NetFlow monitoring is the domain of networks that use Cisco switches. These switches can be configured to send data streams providing the network's usage data to the machine running PRTG which, in turn, analyzes the data.

Because the switch already performs a pre-aggregation of traffic data, the flow of data to PRTG is much smaller than the monitored traffic. This makes NetFlow the ideal option for high traffic networks that need to differentiate the bandwidth usage by network protocol and/or IP addresses.

PRTG Features for NetFlow Monitoring

NetFlow is a bandwidth monitoring technology created by Cisco. PRTG supports flow monitoring using NetFlow Version 5 with the following two sensors:

- NetFlow: Monitors Cisco switches using NETFLOW V5.
- NetFlow (Custom): User configurable version of the NetFlow sensor.

Before you can create NetFlow sensors, you must configure NetFlow on your switch/router. Configure the switch to send the NetFlow packets to the computer running the PRTG probe. Also, configure the NetFlow port and flow timeout. These two values must be defined within PRTG when creating new NetFlow sensors. Don't forget to open the NetFlow port in the PRTG system's firewall.

Limitations

On a powerful 2007/2008 PC, (Dual Core, 2.5 Ghz) you can process about 100,000 flows per second for one NetFlow stream. When using complex filters, the value can be much lower. For example, with a router sending about 2,000 flows/second (which corresponds to mixed traffic at gigabit/sec level) you can expect to configure up to 50 NetFlow sensors operating properly. PRTG internally monitors its own NetFlow processing and you will see a decreased probe health reading as soon as NetFlow packets are not processed due to an overload.

If you experience an overload please consider setting up multiple probes and distribute the NetFlow streams to them. We do not recommend adding more than 400 NetFlow sensors per PRTG probe.

Tools

Paessler NetFlow Tester: NetFlow Tester simply dumps the data of all NetFlow packets that a computer receives from a Cisco router - useful when debugging bandwidth monitoring configurations based on NetFlow protocol.
http://www.paessler.com/tools/

See also

Bandwidth Monitoring Sensor Type Comparison

Paessler Knowledge Base: Configuration Tips for Cisco Routers and PRTG
http://www.paessler.com/support/kb/questions/20/

7.6 SQL Server Sensor Types

Using the SQL Server sensors you can natively monitor the most commonly implemented SQL servers: MySQL, Microsoft SQL, and Oracle SQL. The sensors monitor when the database server process accepts and processes requests. Additionally, you can run a custom SQL command and check the return values.

PRTG supports native monitoring for the following SQL Servers:

- Microsoft SQL Server: Checks Microsoft SQL server connections.
- MySQL Server: Checks MySQL server connections.
- Oracle SQL Server: Checks Oracle SQL server connections.

Common Settings for all SQL Sensors

- Database Name – in this field, the name of the database or the path of the database can be entered in order to access the database information.
- User and Password – provide the username and password to login to the database.
- SQL Expression – provide an expression to fetch data. When a cursor is returned, only the first row will be fetched.
- Result Set – select this checkbox if your SQL expression returns a result set. Then the value of the first column in the first row of the result set is used as the return value of the monitoring request (e.g. will be compared to the limits). Otherwise the “number of affected rows” is regarded to be the return value of a monitoring request.

Notes for MS-SQL Sensors

- Supports SQL Server 2005, SQL Server 2000, SQL Server 7 and MSDE (requires OLE DB installed on the machine running the PRTG probe that accesses the server).
- Instance Name – This holds the name of the instance if you want to connect to a "named instance", otherwise this field should remain empty. **Note:** Sometimes you will see connection strings like SQLSERVER \SQLINSTANCE in database clients. The first part is the server name configured under the general server settings. The second part refers to the instance name mentioned above. **NEVER** enter the string in the instance field of the sensor setup page in this form, merely provide the second part (without the backslash).
- Port – If your SQL server runs the instance at a different static port than 1433, you can define the port number in this field. If your SQL server uses the default value of 1433 or is configured for dynamic port settings, leave this field empty.

Notes for Oracle SQL Sensors

- Supports Oracle 10g, 9i, 8i and Oracle 7 (requires default TCP Port Setting 1521).
- Interface – Oracle offers two possibilities when connecting to the server - either through direct TCP/IP communication (SQL-NET) or via the Oracle Client Interface (OCI). Select the one you want to use for this sensor.
- Port – Under SQL-NET you need to supply the TCP/IP port for the connection in this field. Usually the default value of 1521 is correct. With an OCI connection the setting of the port property is ignored.

Notes for MySQL Sensors

- Supports MySQL server 5.0, 4.1, 4.0 and 3.23.

7.7 File Server Sensor Types

In order to monitor file servers you can use the following sensors.

- WMI Disk Space: This sensor type monitors free disk space via WMI (see WMI Sensors Types)
- WMI File: Monitors a file via WMI (see WMI Sensors Types)
- Share Disk Space: Monitors free disk space of SMB shares (Windows/Samba)
- File: Monitors a file's existence, size, and age and also discovers changes to the file
- Folder: Monitors a folder's existence as well as the number of files and their ages/sizes and also discovers changes to the folder's content

7.8 VMware Server Sensor Types

With PRTG you can monitor the vital parameters of VMware host servers and the virtual machines running on them.

Sensor types are:

- VMware ESX Host Server: Monitors a VMware ESX Host Server
- VMware Virtual Machine: Monitors a single Virtual Machine

While the ESX Host Server sensor only works directly with an VMware ESX 3.x server as its parent device you can use the virtual machine sensor in two ways:

- Use it to directly communicate with a VMware ESX 3.x Host Server to monitor virtual machines running on this server.
- Use it to communicate with a VMware Virtual Center installation to monitor all virtual machines managed by this virtual center. Only this option supports virtual machines running on VMware Server 2.x and virtual machines that are under control of VMware's VMotion feature.

For VMware sensors PRTG needs an administrator login for the host server(s). You can enter these credentials in the VMware Credentials section for the parent device or group. The sensors will then inherit these settings.

Notes:

Due to performance limitations we recommend to keep the number of VMware sensors querying the same virtual server and using the same user account below 20. If you have more sensors you should use two or more user accounts or your should distribute the sensors across multiple probes.

VMware is a registered trademark of VMware Inc.

7.9 Other Sensor Types

The following sensor types allow to monitor various TCP and UDP based services:

- PING: Performs one or more PINGs to monitor the availability of a device and optionally measure packet loss in percent.
- PORT: Checks the availability of TCP based network services.
- FTP: Monitors the availability of a FTP Server.
- DNS: Checks a DNS (Domain Name Service) server.
- SMTP: Monitors SMTP based email servers (Simple Mail Transfer Protocol).
- POP3: Monitors POP3 based email servers (Post Office Protocol V3).
- IMAP: Monitors IMAP based email servers (Internet Message Access Protocol).
- RDP (Remote Desktop): Checks whether the RDP service of a device is available.

All these sensors use the protocol standards.

7.10 Custom Sensor Types

PRTG supports four custom sensor types:

- WMI Custom Sensor: Performs a custom WMI query written in WQL (WMI Query Language).
- EXE: Runs a custom program (EXE, DLL) or script/batch file.

- Packet Sniffer (Custom): Accounts for data packets using user-specific rules, see Packet Sniffing Sensor Types .
- NetFlow (Custom): User configurable version of the NetFlow sensor, see NetFlow Sensor Types.

Custom sensors allow a number of monitoring tasks that go far beyond the standard sensor set to be performed. You can create your own sensors using WQL (WMI Query Language) and by compiling an EXE file, using any Windows software development tool.

In both cases you must create a file and place it in a specific folder on the system running the PRTG probe:

- Place executables (.EXE), batchfiles (.CMD or .BAT), VBS scripts (.VBS), or PowerShell scripts (.PS1) into the "PRTG Network Monitor\custom sensors\EXE" subfolder.
- Place .WQL files with WQL scripts into the "PRTG Network Monitor\custom sensors\WMI WQL scripts" subfolder.

As soon as a file is placed into the folders mentioned above, you can create or edit a Custom EXE sensor or WMI Custom sensor and select the new file from the list of files.

The probe will then execute the file on the probe system. The local probe file will be run on the local system. But for remote probes, the file will actually run on the remote system. If your custom sensor code relies on other files (eg. DLLs, .NET framework, Windows PowerShell, etc.) you must copy/install these files onto the probe machine manually.

See Interface Definition for Custom EXE Sensors for detailed documentation. Sample projects for these Custom sensors can be found in the Knowledge Base on the Paessler website under www.paessler.com/support.

In the parameter fields you can use these placeholders:

- %host: device IP/DNS
- %device: device name
- %probe: probe name
- %name: sensor name

Notes

- For PowerShell scripts, make sure that they may be executed by either signing the files or changing the security policy for Powershell.exe accordingly.
- The API interface for custom EXE sensors is compatible to the custom EXE sensors provided by IPCheck Server Monitor 5.

7.11 Comparison of Bandwidth Monitoring Sensor Types

The following table shows the differences between PRTG's four methods available for bandwidth monitoring:

	WMI	SNMP	Packet Sniffing	Netflow
Setup	Medium	Easy	Easy to Complex (depending on filter rules used)	Can be complex (e.g. the switch must be configured)
Traffic can be filtered	No	No	Yes	Yes

	WMI	SNMP	Packet Sniffing	Netflow
Differentiate bandwidth usage by protocol or IPs	No	No	Yes	Yes
PRTG can show Toplists (Top Talker, Top Connections, Top Protocols, etc.) (V7.1)	No	No	Yes	Yes
Filter bandwidth usage by IP	No	No	Yes	Yes
Filter bandwidth usage by MAC address	No	No	Yes	No
Filter bandwidth usage by physical network port	Yes	Yes	No	No
Monitor network parameters other than bandwidth usage	Yes	Yes	No	No
CPU load on the machine running PRTG	Low	Low	Higher, depends on the amount of traffic	Higher, depends on the amount of traffic
Excess bandwidth usage of monitoring	Small	Small	None (except when monitoring switch ports are used)	Depends on the traffic

Part VIII

Notifications

8 Notifications

"Notifications" are used to send alerts to the user whenever PRTG discovers a defined state, such as slow or failing sensors, or when thresholds are reached. You can define an unlimited number of notifications allowing to use one, or more, of several communication channels like email, pager, SMS messaging, Instant Messenger notification, execute program (EXE file/batch file) or HTTP request, Network Broadcast (NET SEND), play a soundfile and Windows event log entries.

Notifications can be triggered by:

- Sensor status changes (a sensor goes down or up, responses are slow or the sensors show an unusual status).
- When the measured value reaches a specific threshold, (e.g. higher than 1000ms request time for more than 30 minutes).
- Reaching a specific speed threshold (e.g. more than 1Mbit/s for more than 5 minutes. Ttraffic sensors only).
- Reaching a specific data volume threshold (e.g. more than 1 Gbyte transferred in 24-hours. Traffic sensors only).

Notifications can be sent by:

- Email: PRTG 7 provides a built-in mail server (uses MX records to deliver emails) or can use an available SMTP relay.
- SMS or pager message (through third party services).
- Network Broadcast (Note: NetSend is no longer supported on computers running Windows Vista or Windows Server 2008).
- Instant Messenger (ICQ, MSN, Yahoo, AIM).
- HTTP request.
- running an external program or batch file.
- play a sound via external speakers.
- writing an entry into the local system log.

Notifications contain valuable sensor information, such as:

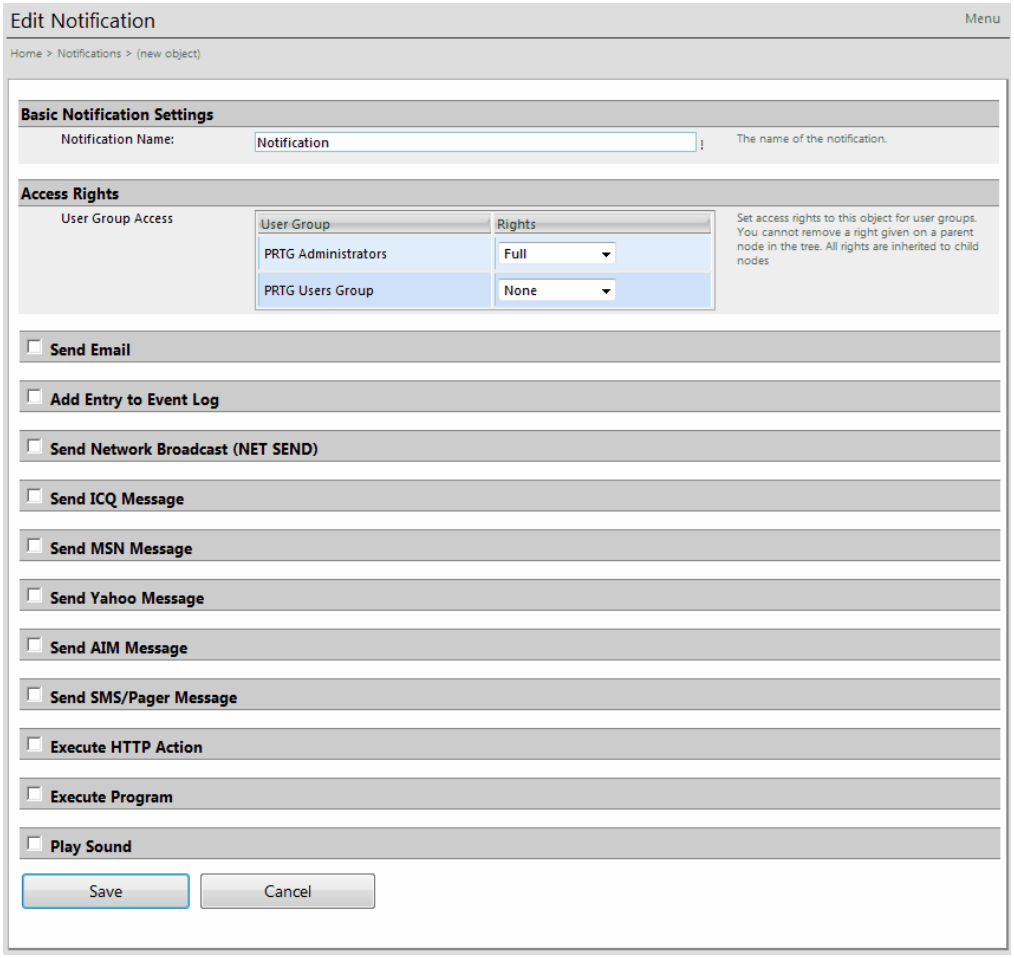
- last error message.
- last good/failed request.
- total downtime.
- total uptime.
- recent sensor history.
- and: email texts, SMS messages, etc. (can be fully edited by the user using placeholders).

Check Notification Setup Before Sending Notifications!

Some notification types require additional setup by the administrator user. Please see System Setup - Notifications.

Creating Notifications

To create and edit notifications choose "Setup|Notifications" from the main menu. Click a name to edit a notification or click on "add notification" to create a new one:



You can enable one or more communication types by checking the respective checkboxes. Then, fill out the specific settings for each type.

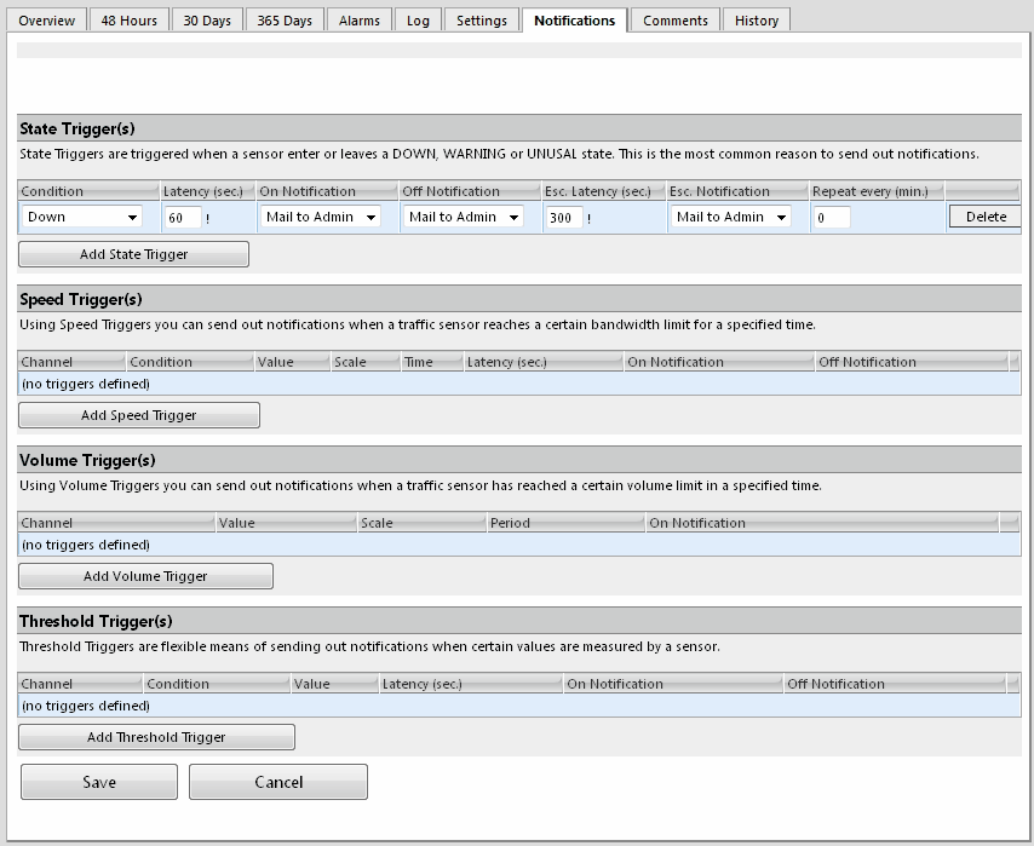
Connecting Sensors and Notifications By Creating Triggers

A notification is sent by a trigger. PRTG supports 4 different trigger types:

- State Triggers: Trigger a notification when a sensor enters an UP, DOWN or UNUSUAL state.
- Speed Triggers: Trigger a notifications when a traffic sensor reaches a certain bandwidth limit for a specified time.
- Volume Triggers: Trigger a notification when a traffic sensor has reached a certain volume limit in a specified time.
- Threshold Triggers: Trigger out notifications when certain values are measured by a sensor.

It is recommended to define triggers for notifications on a group or device level. Sensors will then inherit these settings (see Inheritance of Settings). The advantage is that you can change notifications for multiple sensors by merely editing the notification settings on the group level.

Editing of the notification settings takes place under the "notifications" tabs of groups, devices and sensors:



You can add as many triggers of each type as desired (e.g. one trigger for "DOWN" events and another one for "UNUSUAL" events). Click on Add Trigger, fill out the edit fields and click on Save.

When editing triggers you will see the following settings:

- Latency: Latency is used to defer a notification for a specified time, e.g. to give a server or service the chance to recover from failure or to avoid being spammed with notifications just because a data line was offline for three seconds. For example, if you set the latency for a trigger to 60 seconds, the notification will also be sent if the failure situation remains active for 61 seconds.
- On Notification: This notification will be sent when the trigger becomes active (e.g. a sensor goes down for a state trigger with condition "down").
- Off Notification: This notification will be sent when the trigger becomes inactive (e.g. a sensor goes up for a state trigger with condition "down").

Escalation Notifications

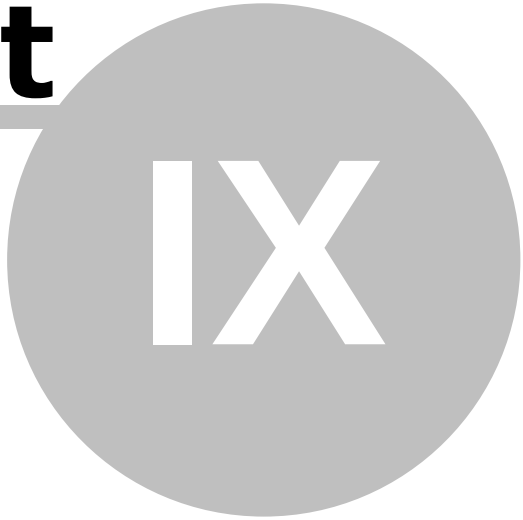
If an error situation remains unsolved for some time, it is a good idea to send additional notifications (e.g. with a more aggressive recipient list) called Escalation Notifications. You can set the latency time to control when escalations are sent and you can also choose to repeat escalation mails every X minutes.

- Escalation Latency: This is the latency time after which escalation notifications will be sent.
- Escalation Notification: The notification that will be sent.
- Repeat every (min): If this value is unequal to zero the notification will be re-sent at the specified interval.

More

- Account Settings - Notifications
- System Setup - Notifications

Part



Maps

9 Maps

PRTG's "maps" feature is a unique concept that enables the user to create web pages with up-to-the-minute monitoring status information in a customizable layout. There are countless possibilities for the implementation of maps. For example this feature can be used to:

- Create network maps with an overlay of status icons for each device on the map.
- Create "dashboard" views that can be shown on network operations center screens.
- Create a quick network overview for publishing on the Intranet, allowing at-a-glance information for management of other employees.
- Create a custom view of the most important sensors in your monitoring setup.
- Create Top 10 lists of the sensors of a specific group or device.

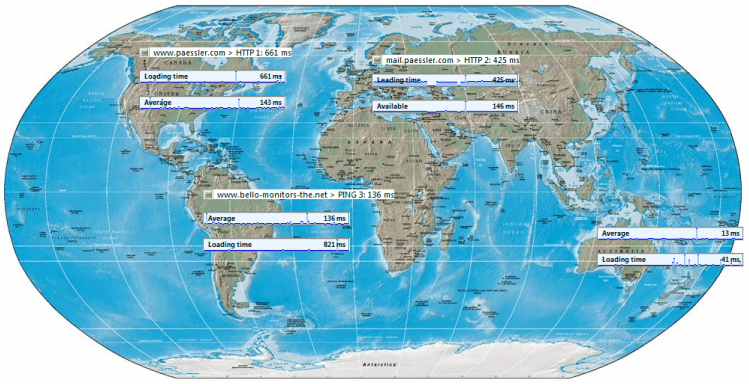
Technically a map is a normal web page and consists of the following:

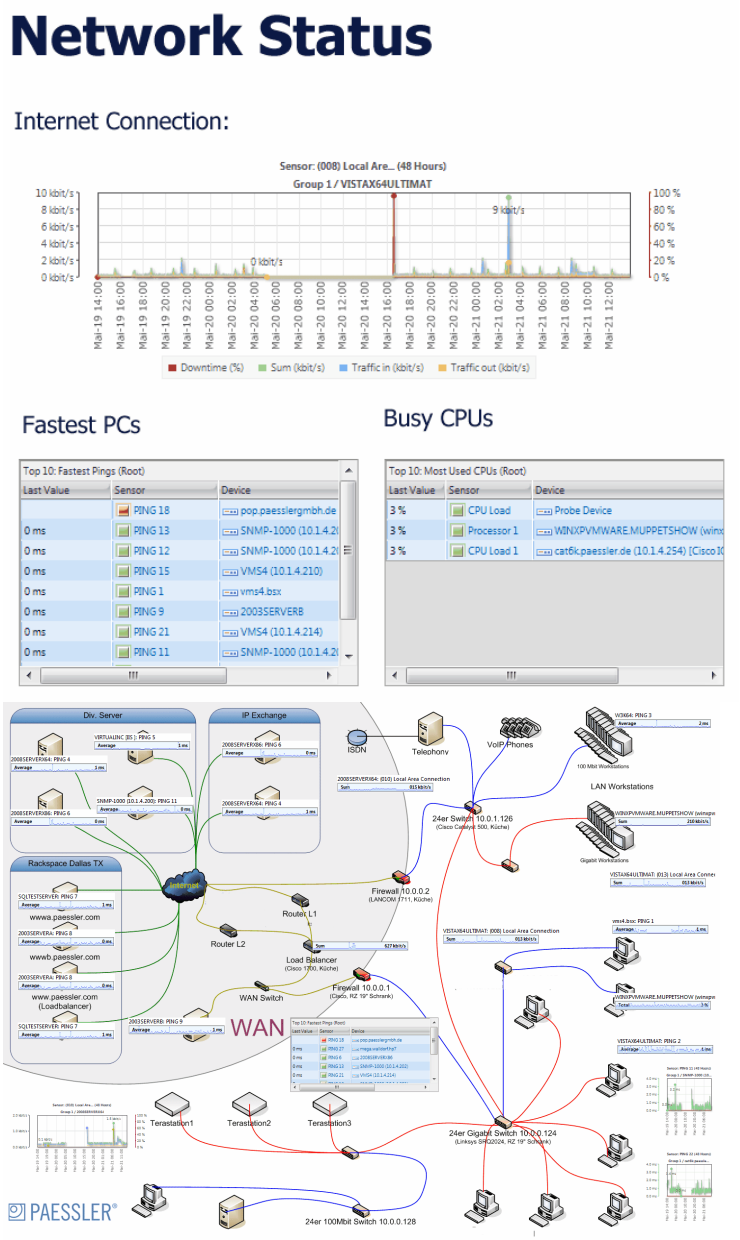
- an optional background image (a PNG/GIF/JPG file, e.g. your company logo, a graphical view of your network).
- a set of map items, which can include a sensor status icon, a graph or a list of sensors.

You can also specify the size of the map. Using the AJAX-based map editor, you can place the items anywhere on the map and you can also control the size of the items. Each map has a unique URL which can be used to link to the map. Users who want to access the map either need an account under your PRTG installation, or can access a "public URL" of the map if you enable the "Public Map" feature. Public maps contain a unique access key ("Map ID") in the URL that secure the map from unwanted visitors.

Sample maps

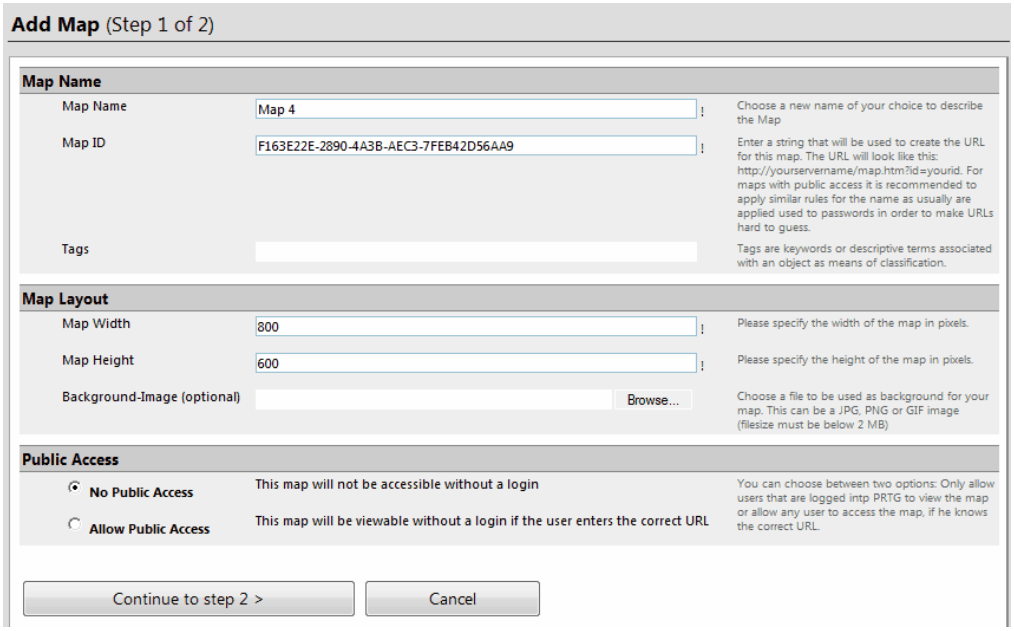
Here are a few sample maps:





Step 1: Create a New Map

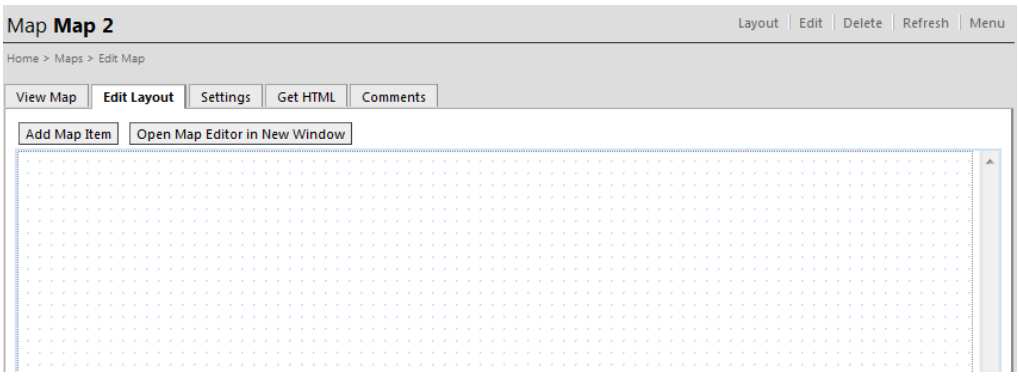
To get started select "Maps|Add New Map" from the main menu:



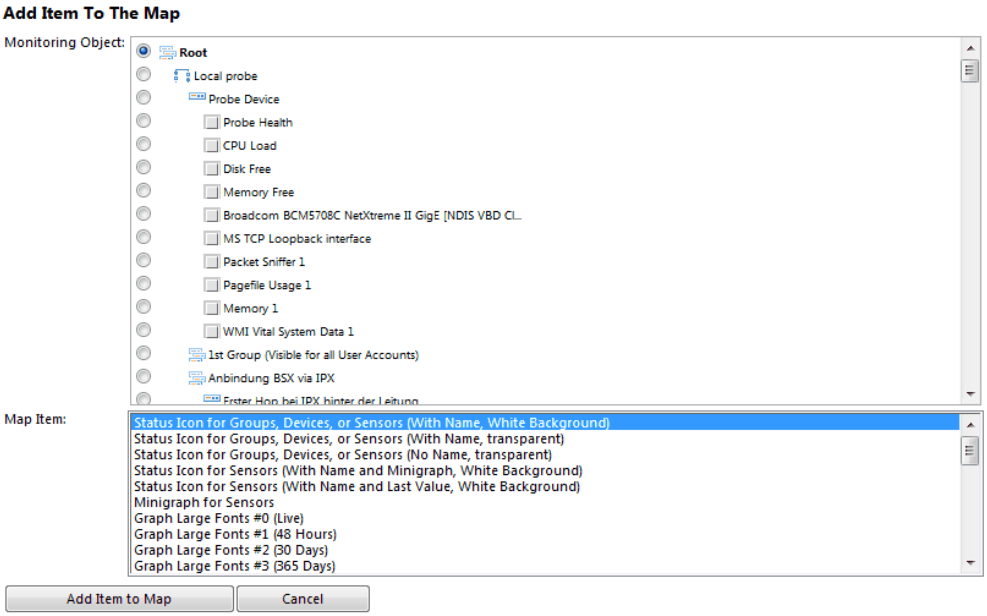
Fill out the fields and optionally select a map background image. Enable "Allow Public Access" if you want users without a PRTG user account to be able to view the map. Click "Continue to Step 2" and you will be taken to the new map.

Step 2: Add Items to the Map

Click on "Edit Layout" to enable the Map Editor:

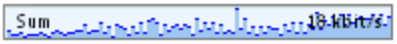


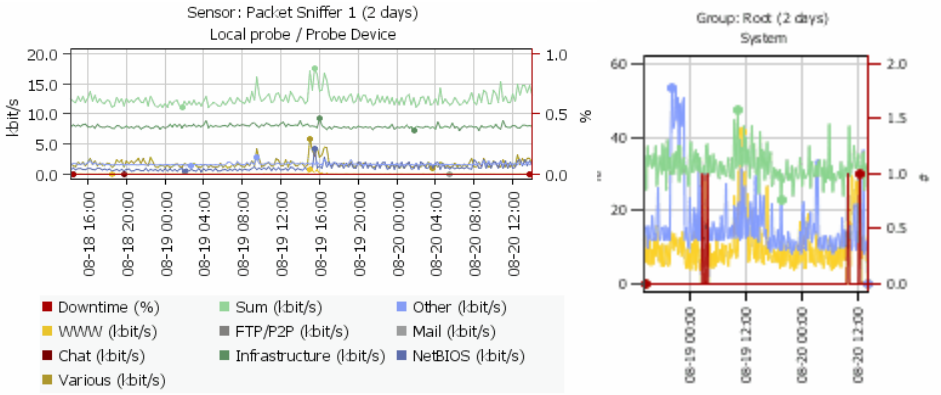
To add an item to the map click on "Add Map Item":



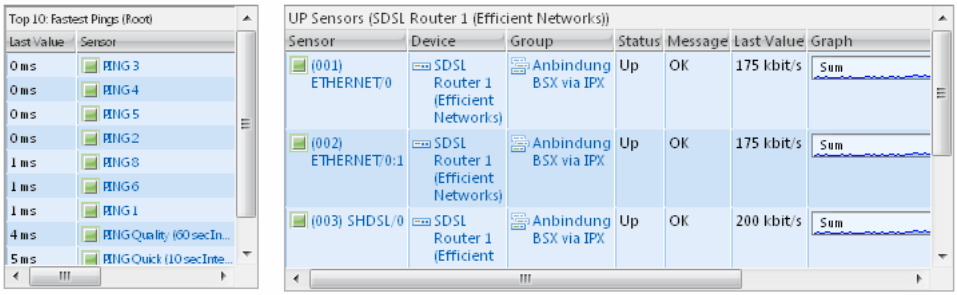
Choose a group, device or sensor from the sensor tree and select a map item from the lower list.

The following map items are available:

- Status Icons (several types):
  Root: 1 1 167 6
- Minigraph (for sensors only):
  

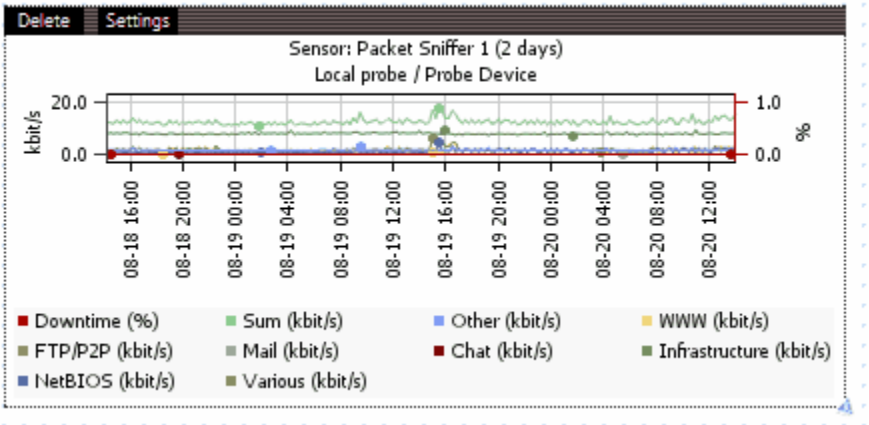
- Graphs (several types):
  

- Tables (several types):

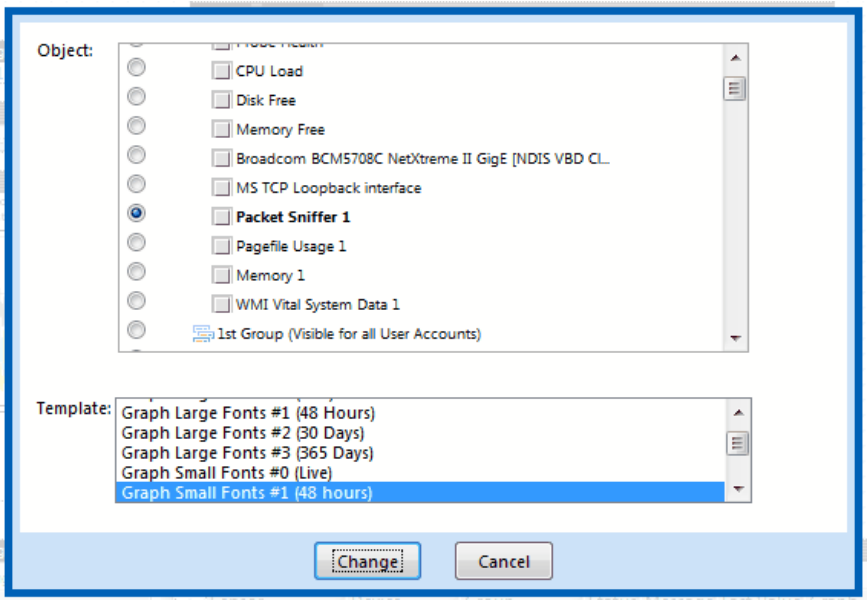


Step 3: Move and Edit Map Items

As soon as you have added an item to the map you can modify it as follows:



- Move the item by clicking and dragging the black "grip bar" at the top.
- Resize the item by dragging the blue arrow at the bottom right corner.
- Delete the item by clicking the "Delete" link.
- Edit item settings by clicking the "Settings" link: You can then change the associated monitoring item as well as the template.



Step 4: View a Map and Share a Map

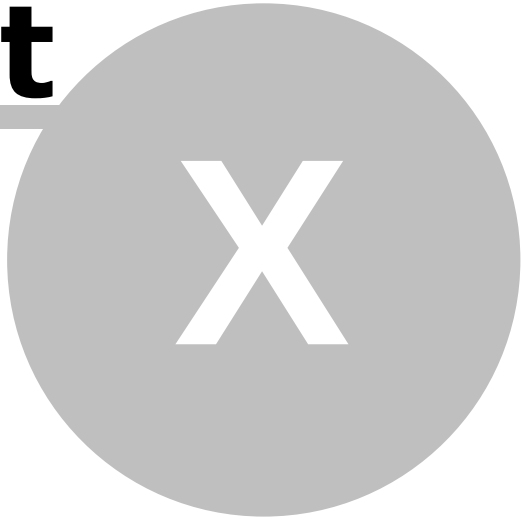
Click on "View Map" to look at the final layout.

To use the map outside of PRTG you have to two options:

- Option 1: Link to a web page with the map.
- Option 2: Show a map inside other webpages using an IFRAME.

Please click on "Get HTML" in order to discern the necessary URLs and HTML codes as well as additional instructions.

Part



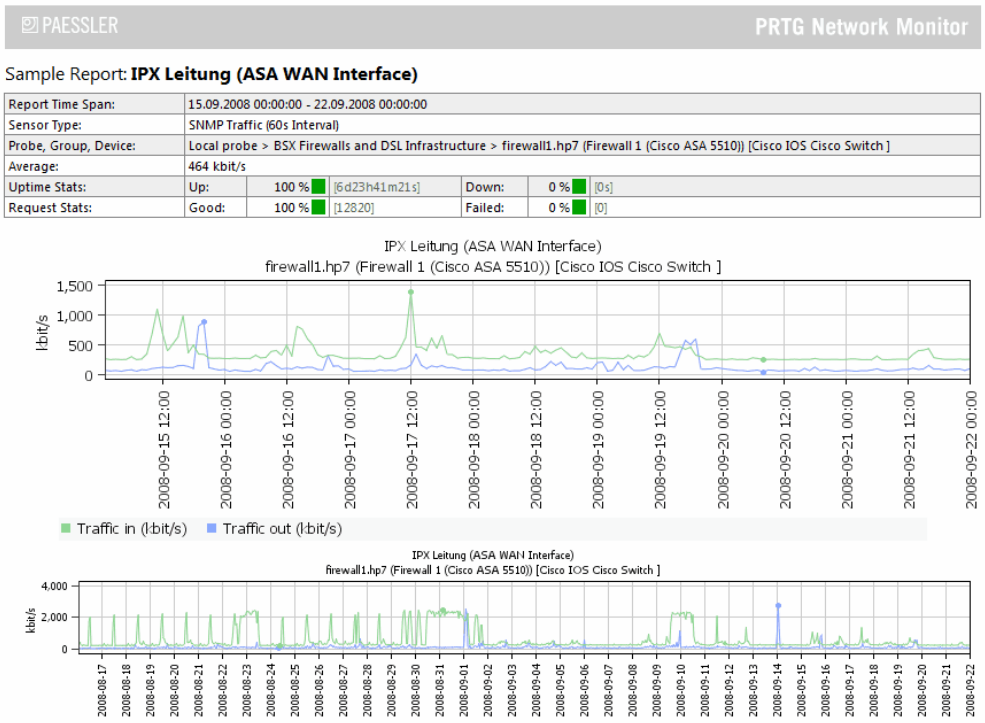
Reports

10 Reports

Reports are used to analyze historic monitoring results over a specified time such as one day, one month or one year.

PRTG includes a powerful reporting engine for ad-hoc, as well as scheduled report generation in PDF format. Reports can be run on-demand or can be scheduled (e.g. once a day). A report can be created for one or more sensors. The content and layout of the report is controlled by the report template of your choice and is the same for all sensors in a report.

Here is a sample report page for one sensor: You can see two graphs (one for the current month and one for the sensors history over the last 365 days) plus a data table with the numerical results:

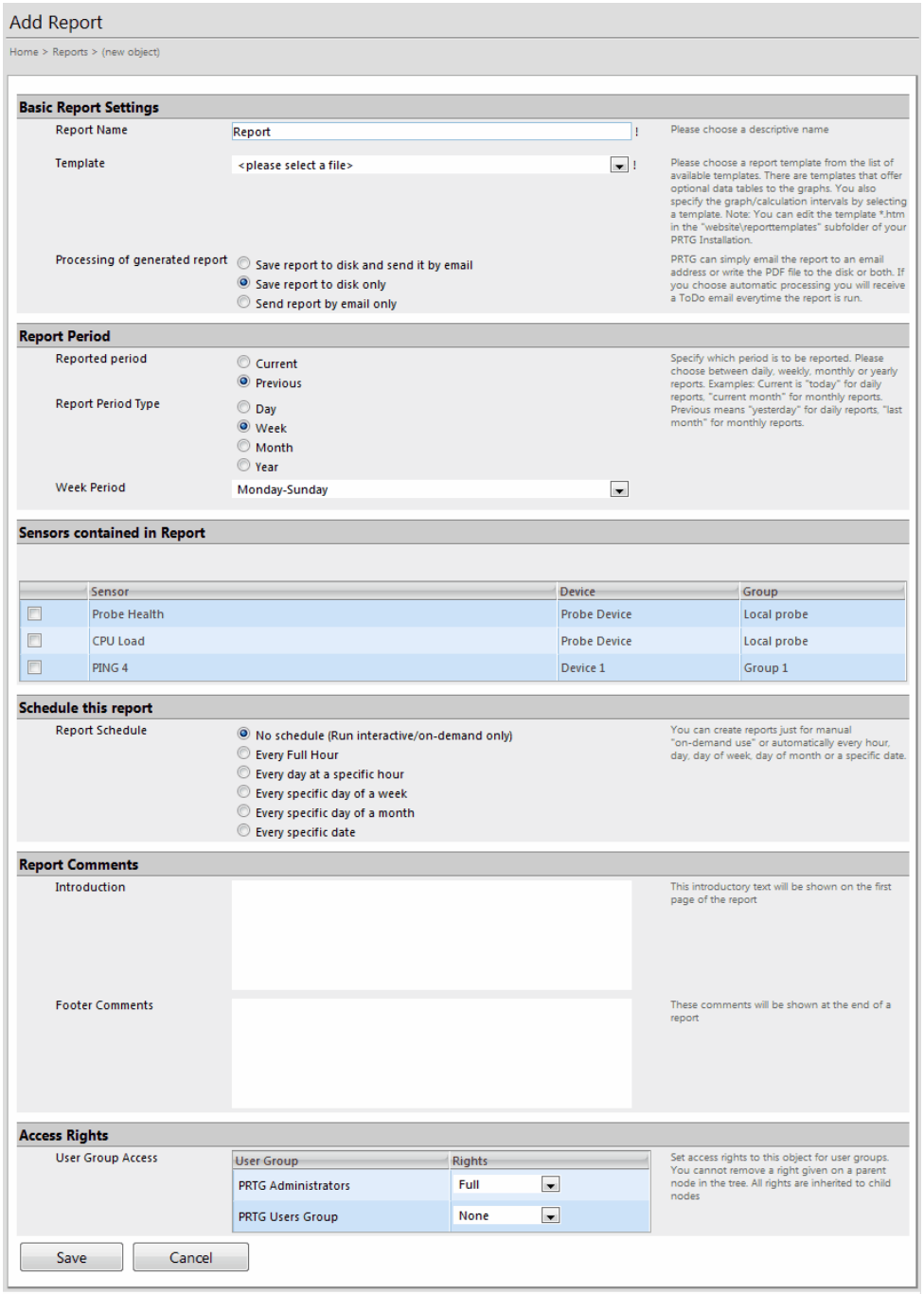


Date Time	Traffic in (Volume)	Traffic in (Speed)	Traffic out (Volume)	Traffic out (Speed)	Coverage
21.09.2008	2.993.862 KByte	284 kbit/s	899.783 KByte	85 kbit/s	100 %
20.09.2008	2.716.966 KByte	258 kbit/s	770.235 KByte	73 kbit/s	100 %
19.09.2008	3.719.085 KByte	353 kbit/s	1.868.967 KByte	178 kbit/s	100 %
18.09.2008	3.450.011 KByte	327 kbit/s	1.122.424 KByte	106 kbit/s	100 %
17.09.2008	4.314.449 KByte	409 kbit/s	1.122.875 KByte	106 kbit/s	100 %
16.09.2008	3.927.667 KByte	374 kbit/s	1.205.807 KByte	115 kbit/s	100 %
15.09.2008	4.392.578 KByte	418 kbit/s	1.674.498 KByte	159 kbit/s	100 %
Sums (of 7 values)	25.514.618 KByte		8.664.589 KByte		
Averages (of 7 values)	3.644.945 KByte	346 kbit/s	1.237.798 KByte	118 kbit/s	100 %

Creating reports involves 3 steps:

Step 1: Setting up a Report

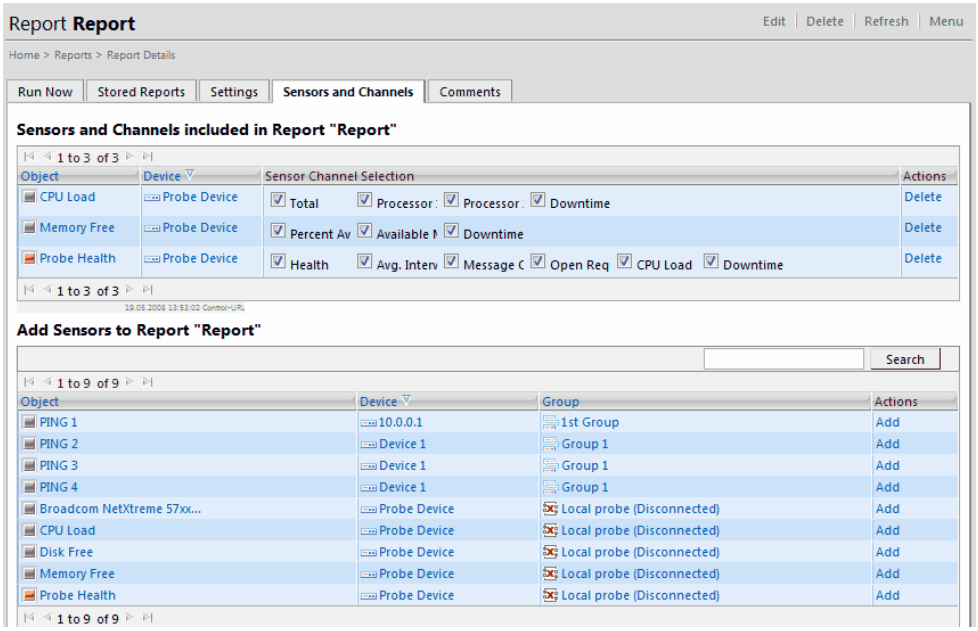
Select choose "Reports|Add Report" from the main menu to get started:



Click on "Save" when your are done with the settings.

Step 2: Editing the List of Channels

On the next page you can review and fine tune the list of sensors and channels:



You can enable individual channels of a sensor using the checkboxes. Use the "Delete" links to remove a sensor from the report. To add more sensors to a report choose one from the list of all sensors in the lower half and click the "Add" link. To find a specific sensor either use the paging function of the table or enter a search term in the search box and click "Search".

Step 3: Run the Report Interactively (or wait for the Schedule)

Click on the "Run Now" tab to run the report now:

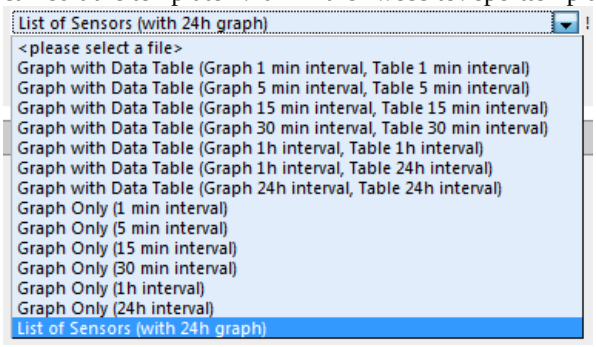
Select the desired settings an click on "Run Report".

- HTML Reports will be shown immediately.
- PDF reports will be created in the background and you will receive an email with a Todo when the report is finished.

Editing Report Settings

To configure a report you must edit the following main settings:

- Name: Please choose a descriptive name.
- Template: You can choose from the list of available templates. There are templates that offer optional data tables besides the graphs. You also specify the graph/calculation intervals by selecting a template. Note: You can edit the template *.htm in the "website\reporttemplates" subfolder of your PRTG Installation.



- Report Type: Please choose between daily, weekly, monthly or yearly reports. Choose "Current" period for reports that are intended to include the present moment (i.e. a monthly report run on the 20th of the month covers the period from the 1st to 20th of the current month) or "previous" period (i.e. a monthly reports always cover the full previous month).
- Sensors: Select the sensors for the report (note: If you have more than 500 sensors you can not add sensors while creating the report, you must add them later).
- Schedule: You can create reports for manual "on-demand use" or for automatic generation every hour, day, day of week, day of month or a specific date.
- Processing: PRTG can email the report to an email address, save the PDF file to disk or both.

If you choose automatic processing you will receive a Todo email every time the report is run.

Part XI

Todos

11 Todos

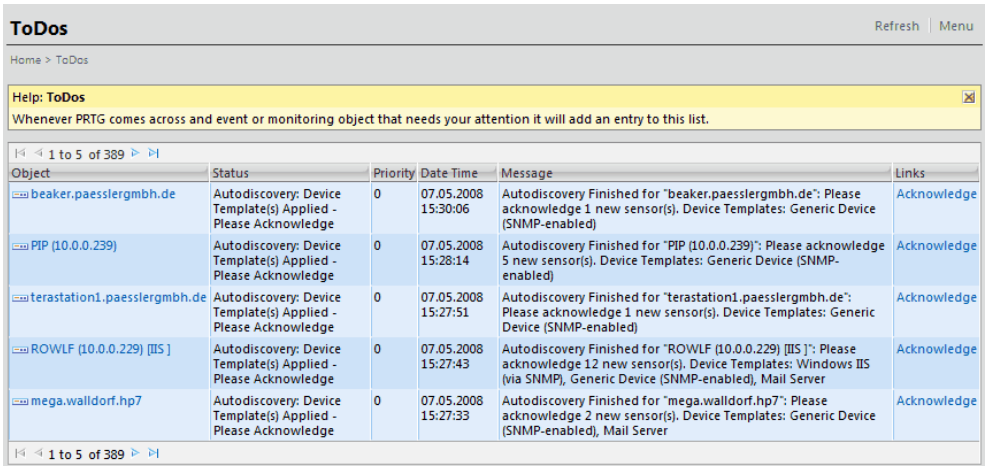
Todos ("To Dos") are PRTG's way to hand over tasks to you as the administrator, when an event occurs that PRTG can not handle without attention.

You will see a new Todo whenever any of the following situations arise:

- The auto discovery has discovered a new device and has created new sensors and you should acknowledge them.
- A probe which was not connected before has connected and this new probe must be acknowledged by the administrator.
- PRTG's built-in check for new versions has found that a a new version of the software is available from Paessler.
- A PDF report has been created and is now ready for review.
- A critical situation has shown up on the server system (e.g. system runs out of disk space, licensing issues, etc.).

Whenever a new Todo is created by PRTG, the administrator user will receive an email asking to take care of the issue (you can disable this automatic email in the system settings). Todos remain in the list until they are acknowledged (by clicking on "acknowledge").

Click on "Todos" in the main menu to see a list of all Todos:



Note: You can acknowledge all todos at once by choosing the corresponding item from the Todo menu.

Part XII

User Management

12 User Management

The default administrator can use the PRTG installation as the only user or can create an unlimited number of users.

Users are organized using an unlimited number of groups. All the security settings as well as the rights management are conducted via the user groups. This means that group membership controls what a user may do and see when logged in.

Creating New Users

For each new user the administrator user must specify a login name and an email address. New users can be created by selecting "Setup|Users" from the main menu and clicking on "Add new user".

Tip: If you want to control the rights of each user individually, you must create a user group for each user. This can be automated by choosing "Create new user group for this user" from the "Primary Group" drop-down when creating a new user account. This will create a new user and a new user group with the same name. In turn, you can use this user group to control the user's rights individually.

User Account Settings

Each user account has a number of settings that can be changed by the user (choose "Setup|My Account" from the main menu) or by the administrator. These settings are:

- Password: Here you can change your login password.
- Time zone: All times will be shown in this time zone as soon as the user is logged on.
- Auto refresh type and interval: PRTG automatically refreshes the content in your browser. Here you can choose between two different refresh methods, you can disable the refreshing and you can specify the refresh time (30s recommended).
- Graph rendering and graph delay: Choose whether you would like graphs based on static images (which load faster) or Flash based graphs (which offer more interactivity, e.g. with hover information for each value).
- Autofolding Settings: In order to provide you with a speedy user experience PRTG tries to keep the page size for the pages with the sensor tree small by automatically "folding" groups and devices with many items. The two settings "Max. Groups/Devices per Group" and "Max. Sensors per Device" control how many groups/devices or how many sensors are shown at max before the automatic reduction is performed. Recommended values are 10-30 for both settings. If you do not want to see any individual sensors in the tree view enter a zero for "Max. Sensors per Device".
- Active/inactive: The administrator can set a user to inactive, meaning the user can not log on.

Creating New User Groups

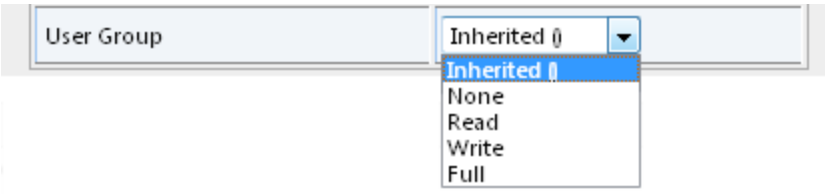
Creating new users is performed by selecting "Setup|User Groups" from the main menu and clicking on "Add new user group".

Controlling User Rights

Throughout the web interface of PRTG you can control access to the monitoring objects (e.g. groups, devices, sensors, maps, reports, etc.) using the following settings:

For sensor tree objects the default setting is to "inherit settings from parent object" which means that a user has the same access rights to all child objects if one has access to the object itself.

This can be overridden with the "Specify Settings" option. You can specify the access rights to the current object for each user group by choosing an option from the drop down list:



The options are:

- None: User can not see or edit the object. The object does not show up in lists and in the sensor tree - unless a child object is visible to the user, then the object is visible in the sensor tree, yet not accessible.
- Read: User can see the object and review its monitoring status.
- Write: User can see the object, review its monitoring status and edit the object's settings - except for group access settings.
- Full: Same as "Write", but the User can additionally control the group access settings.

A user can only add and delete objects if the user has "Write" or "Full" access to the parent object.

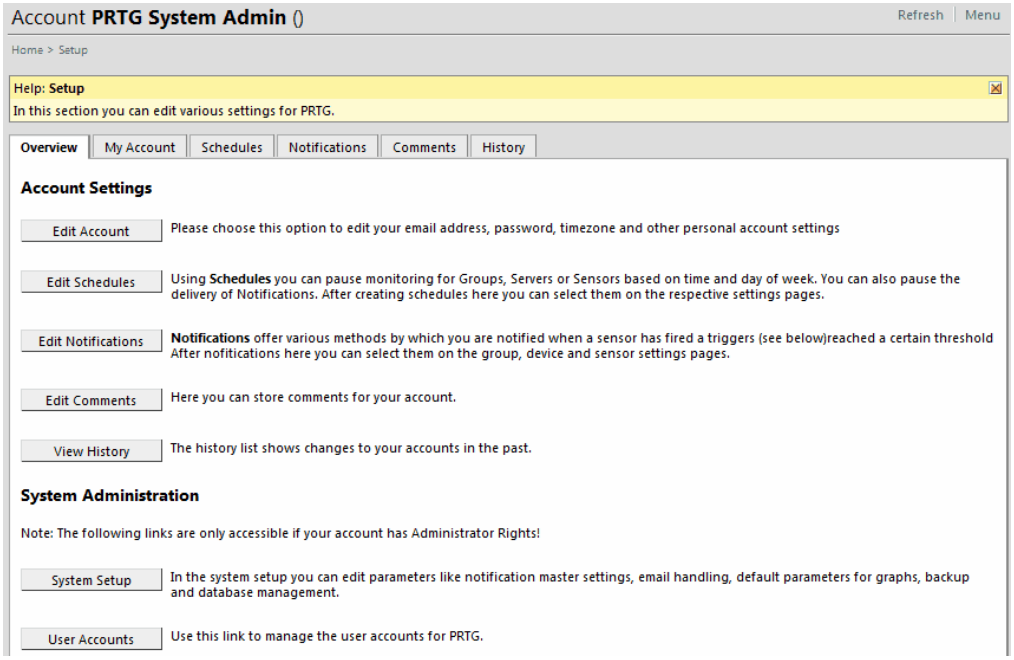
You will see an additional checkbox for groups and devices, "Revert children's access rights to inherited". If you select this box, the access right of all child objects will be reset to "inherited" which actually deletes all individual right settings for the underlying objects. This is the quick way to reset all access rights and should be used with caution.

Part XIII

System Settings and Administration

13 System Settings and Administration

The settings for your account, the system settings and most of the system administration settings are available from the "Setup" menu in the web interface. Some settings (e.g. web server IP and port and license key) are located in the Server Admin Tool and Probe Admin Tool.

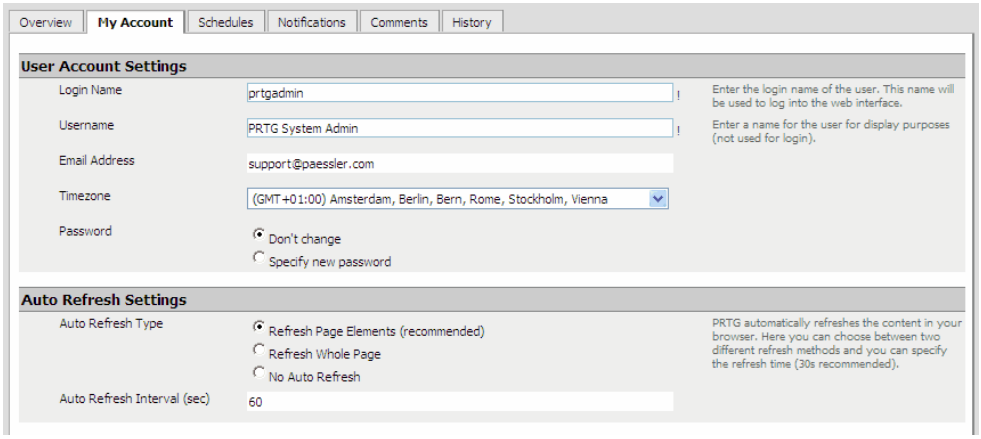


Please read on in the following sections:

- Account Settings - My Account
- Account Settings - Schedules
- Account Settings - Notifications
- System Setup - Web Server
- System Setup - Probes
- System Setup - Notifications
- Core Server Admin Tool
- Probe Admin Tool

13.1 Account Settings - My Account

Under "My Account" you can change various settings specific to your user account:

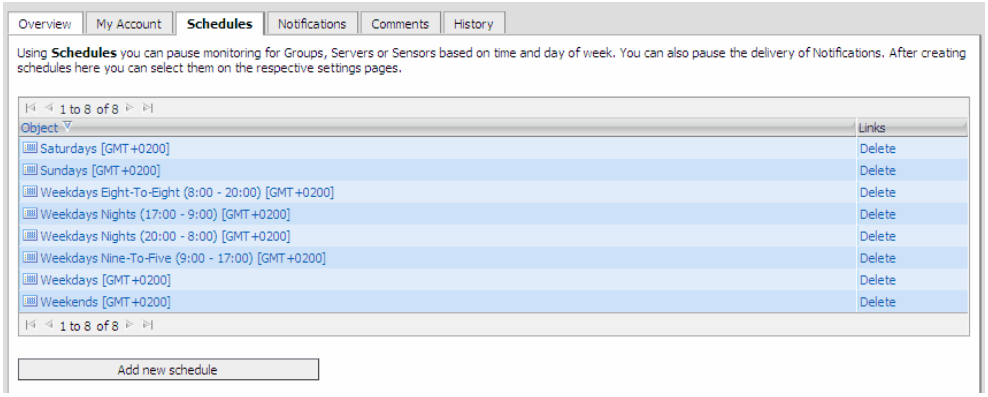


This page allows to define the following information in detail:

- User Account Settings: These fields allow you to define the login name, the user name, the email address for the user, the time zone and allows you to set a new password.
- Auto Refresh Settings: Using these fields you can select whether you want the content of your browser to be refreshed automatically or not, if you want to merely refresh page elements or the entire page, and what refresh interval (in seconds) you want to use.
- Web Interface Settings: These fields allow you to select the charts display mode: select static images for faster graph processing or Flash for increased interactivity. You can further select to turn the contextual help on and off.
- Autofolding Settings for the Sensortree: PRTG tries to keep the page size for the pages with the sensor tree small by automatically "folding" groups and devices with many items. In these fields you can define how many groups/devices or how many sensors maximum are to be shown before the specific branch is reduced (folded).
- Account Control: These fields allow you to define to what group(s) the user in case belongs to, among other defining the user's access rights. Non-admin users can also be set to active or inactive by selecting the respective radio button (available for the admin only).

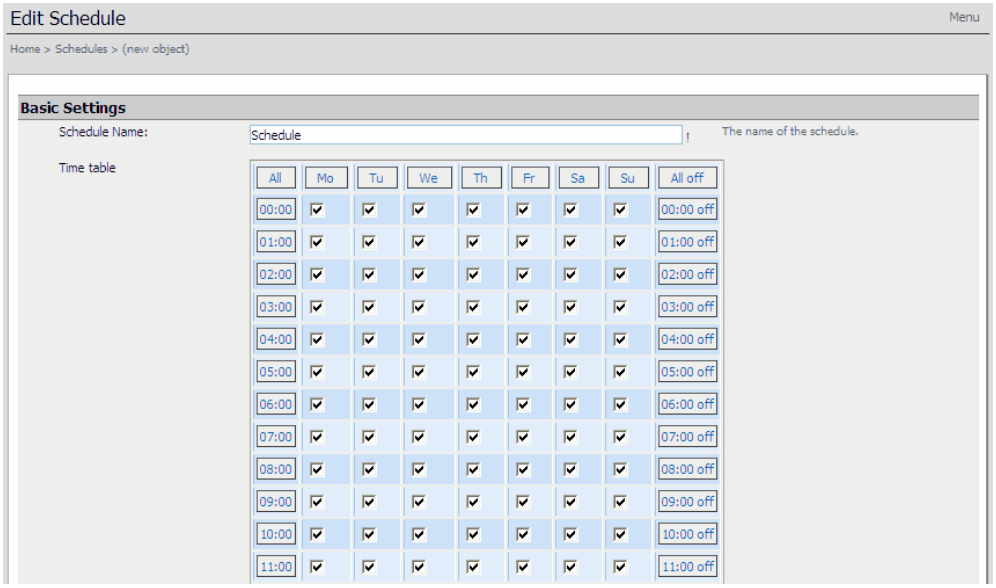
13.2 Account Settings - Schedules

Under "Schedules" users can define a timetable that can be used to pause monitoring for groups, servers or sensors based on time and day of week, as well as pause the delivery of notifications.



Various common schedules are available by default, further schedules can be added using the "Add new schedule" button.

By either selecting an existing schedule or when adding a new schedule, the following window appears:



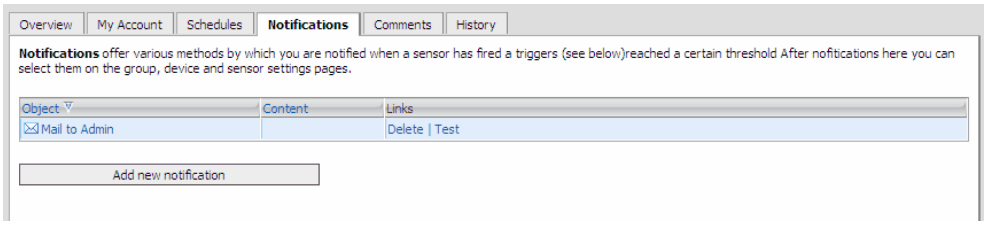
Here you can provide a schedule name for identification purposes, as well as check the respective checkboxes to determine the time range of the schedule. Clicking on the daily icons at the top or at the daily "off" icons at the bottom allow to select/deselect entire daily ranges. Clicking on the hourly icons on the left, or on the hourly "off" icons on the right, allow to select/deselect entire hourly ranges.

At the very bottom of the window, you can also assign user group access rights as pertains the selected schedule. The following rights can be assigned:

- None: This user group has no access to the schedule whatsoever. As such, this user group can not see or edit the specific schedule.
- Read: This user group has read access to the schedule. The group can see, but not edit, the specific schedule.
- Write: This user group has read and write access to the schedule. The group can see and edit the specific schedule.
- Full: This user group has read and write access to the schedule, plus it can assign schedule access rights to other user groups.

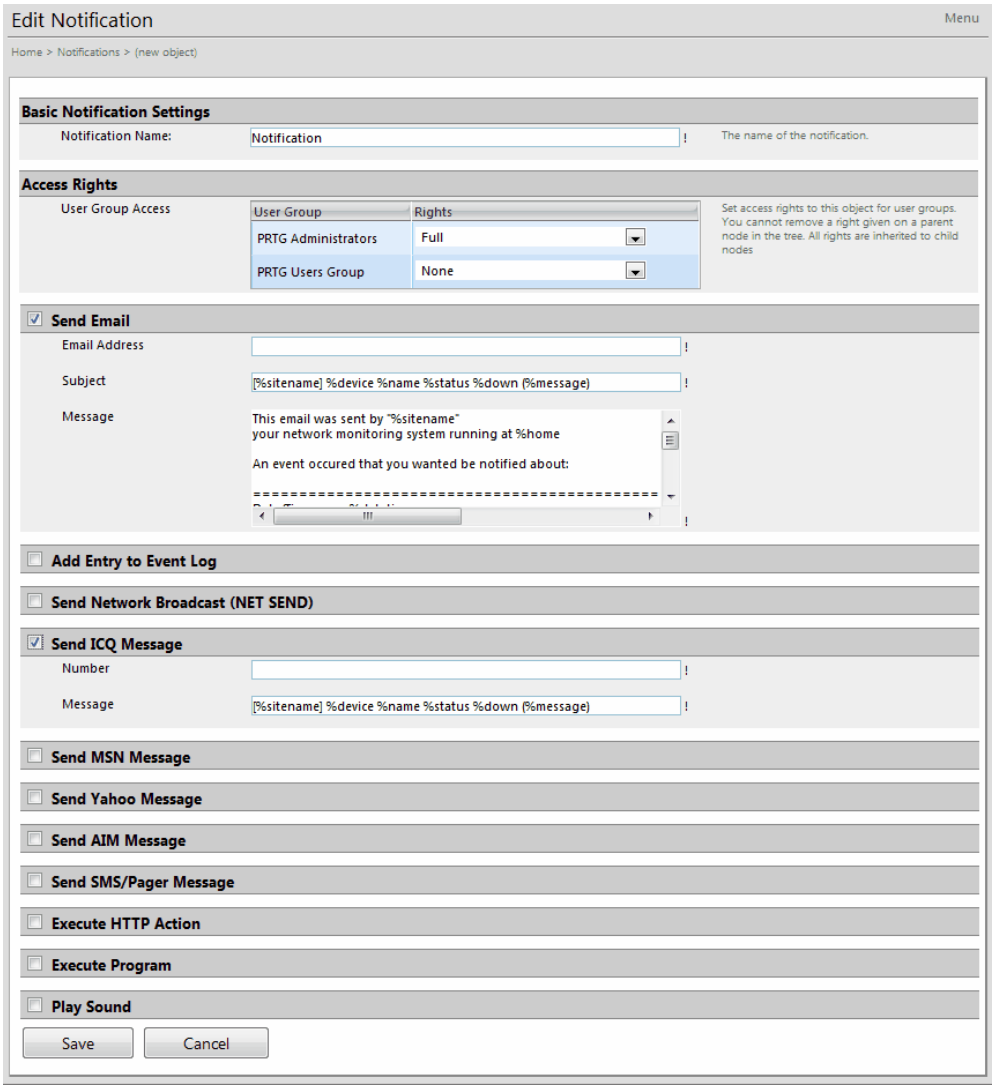
13.3 Account Settings - Notifications

Under "Notifications" you can discern an overview of all configured notifications (see Notifications).



Clicking on any particular notification will direct you to the its configuration page. You can add a new notification by clicking on the "Add new notification" button. Use the "Delete" link to remove any particular notification or use the "Test" link to test any particular notification.

The edit page looks like this:



You can also assign user group access rights as pertains the selected notification. The following rights can be assigned:

- None: This user group has no access to the notification whatsoever. As such, this user group can not see or edit the specific notification.
- Read: This user group has read access to the notification. The group can see but not edit the specific notification.
- Write: This user group has read and write access to the notification. The group can see and edit the specific notification.
- Full: This user group has read and write access to the notification, plus it can assign notification access rights to other user groups.

First you can enter a name for the notification and you can set the user group rights (e.g. if you want to enable or disable the use of a specific notification by some users).

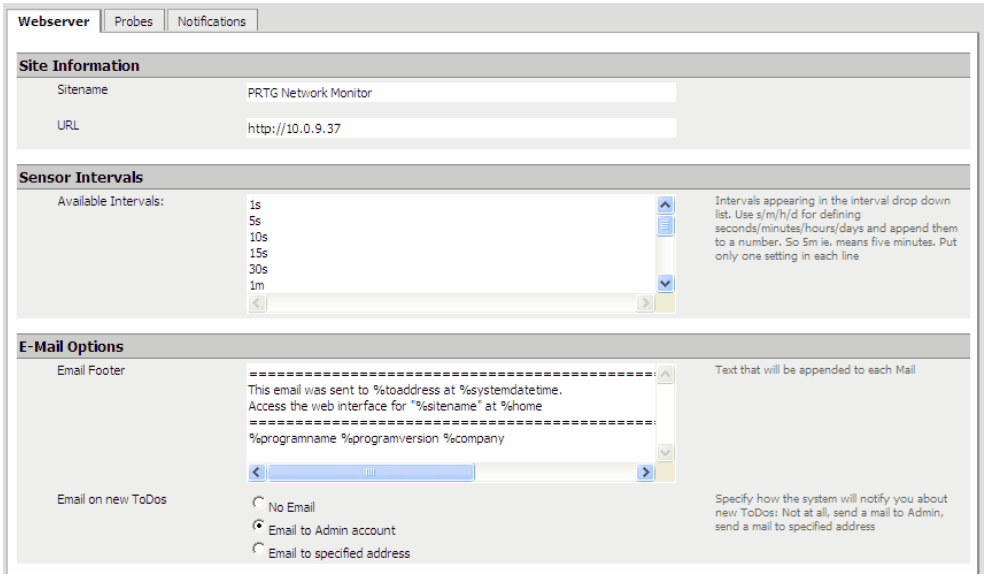
Using the checkboxes you can activate various methods of notification. For each method you must enter the receiver address. Optionally, you can also change the notification texts (the available placeholders are explained on the right).

Note: For notifications with instant messengers, it is important to understand that in order to use instant messaging for notifications you always need two accounts: One account that sends the messages and another one that receives the messages.

Important: For most notification methods, you must enter the sender information in the System Setup - Notifications screen.

13.4 System Setup - Web Server

Under the "Web Server" tab it is possible to define specifics relevant to the web server:



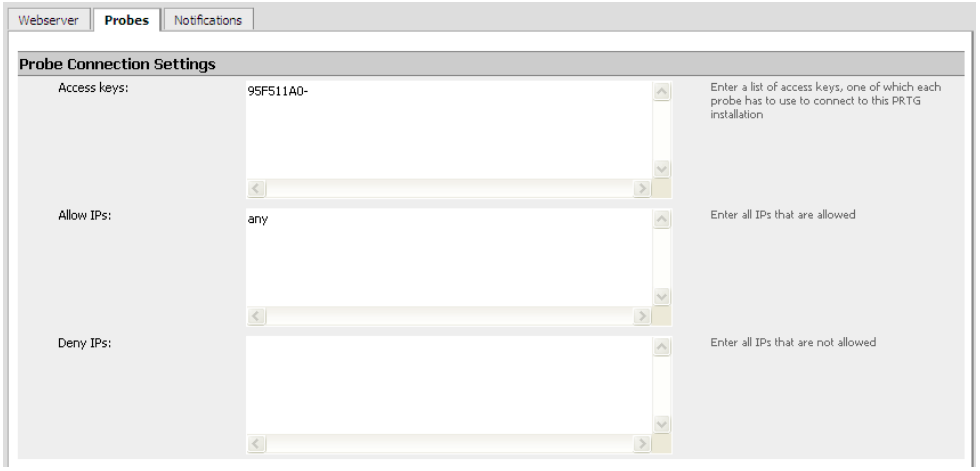
This page allows to define the following information in detail.

- Site Information: Here you can define a site name (used in the web interface and in the subject of emails), as well as the URL for the site (used for building links in emails). If you want to use a symbolic (DNS-) name to access PRTG's web server you must enter the name here.
- Sensor Intervals: Here you can define intervals which will in turn become selectable when adding objects to the installation. In order to add a new interval value merely add a numerical value followed by a time span enumerator (s/m/h/d for defining seconds/minutes/hours/days respectively).
- Email Options: Here you can edit the footer that will be added to outgoing emails (placeholders allowed) and define whether "Todo" emails are to be forwarded to the administrator, a specific email address or to no one at all. If "specific email" is selected, a new field appears allowing to define the email address in case.
- Data Purging Limits: Here you can select for how many days historic data remains accessible. Enter the number of days to retain historic data for each of the available entries.
- Unusual Detection: Here you can define the sensitivity of the "unusual" state detection mechanism.

- Settings from the PRTG Server Administrator program: These entries are "for your information" only. These entries can be edited from the PRTG Server Administrator applet under Start | PRTG program group (see Core Server Admin Tool).

13.5 System Setup - Probes

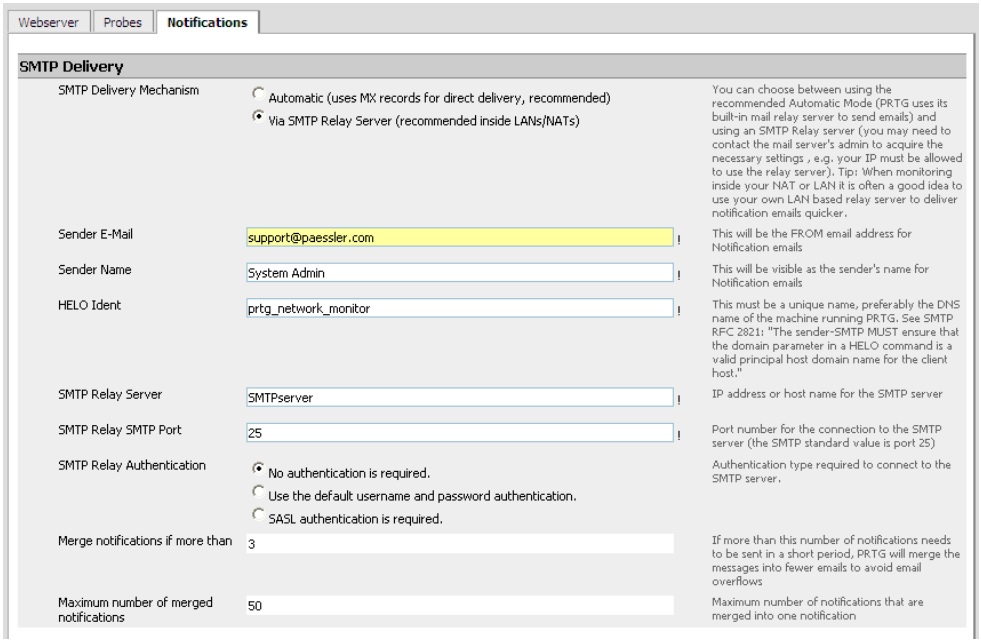
Under the "Probes" tab it is possible to define specifics relevant to probes:



- Probe Connection Settings: Here you can define access keys, as well as allow / deny specifics IPs access to the probe(s). See Multiple Probes and Remote Probes.
- Settings from the PRTG Server Administrator program: These entries are "for your information" only. These entries can be edited from the PRTG Server Administrator applet under Start | PRTG program group (see Probe Admin Tool).

13.6 System Setup - Notifications

Under the "Notification" tab it is possible to define specifics relevant to notifications (see Notifications):



Note: It is important to understand that in order to use instant messaging for notifications you always need two accounts: One account that sends the messages and another one that receives the messages.

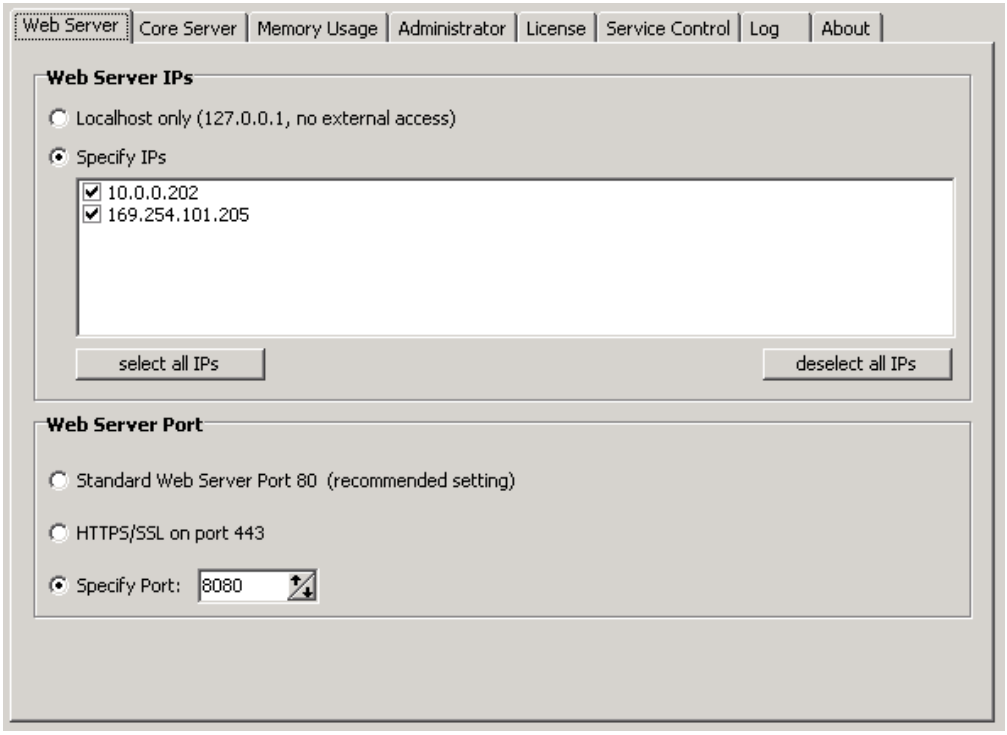
This page allows to define the following information in detail.

- SMTP Delivery: Here you can define the SMTP delivery mechanism (either use PRTG's automatic relay or define your own SMTP server), as well as all relevant information for email forwarding. If you select to define your own SMTP server, you will need to provide your server's information, including the server itself (use either IP address or DNS name), the SMTP port, as well as the relay authentication type (standard or SASL). If you require authentication, username and password need to be provided. Furthermore, it is possible to define when PRTG should start merging individual notifications, as well as provide a maximum number of notifications to be merged at any given time (this will reduce the number of mails that you will receive).
- SMS Delivery: From the drop-down, select your SMS gateway provider. Furthermore, provide your gateway's access username and password.
- ICQ Delivery: Provide your ICQ number and password for the account intended to relay (not receive!) ICQ notifications.
- Windows Live Messenger (MSN Messenger) Delivery: Provide your MSN ID and password for the account intended to relay (not receive!) MSN notifications.
- Yahoo! Messenger Delivery: Provide your Yahoo! Messenger ID and password for the account intended to relay (not receive!) Yahoo! Messenger notifications.
- AOL Instant Messenger Settings: Provide your AIM ID and password for the account intended to relay (not receive!) AIM notifications.

13.7 Core Server Admin Tool

The Core Server Admin Tool can be started from the "START | PRTG Network Monitor" program group and allows to configure implemented probes. The Core Server Admin Tool is divided into eight tabs:

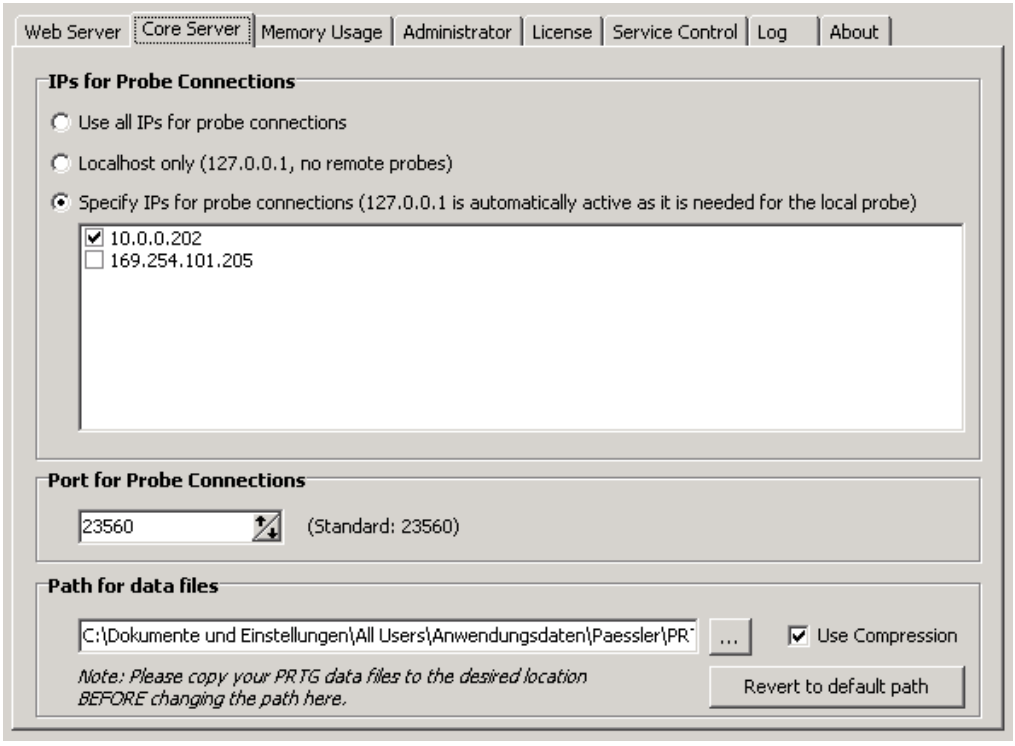
Web Server



Under the Web Server tab you can define the web server IP addresses. You can select to use local host only (which means that no external access will be possible. This is the most secure setting) or specify individual IPs from a list provided. You can further define the web server port to use. The options are:

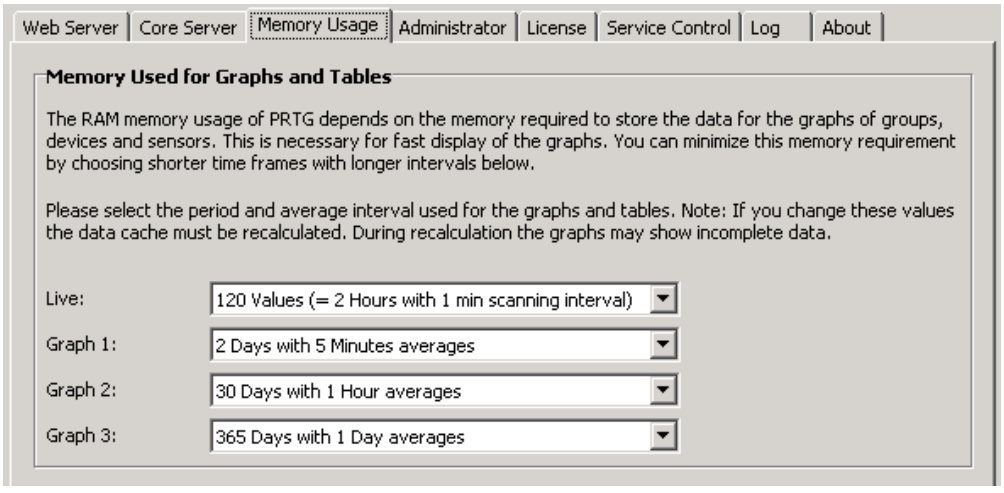
- Standard Web Server Port 80: This is the standard port used and recommended for most installations.
- HTTPS/SSL on port 443: Website can only be used via secure SSL ("https://(your IP)").
- Specify Port: Enter a port number of your choice.

Core Server



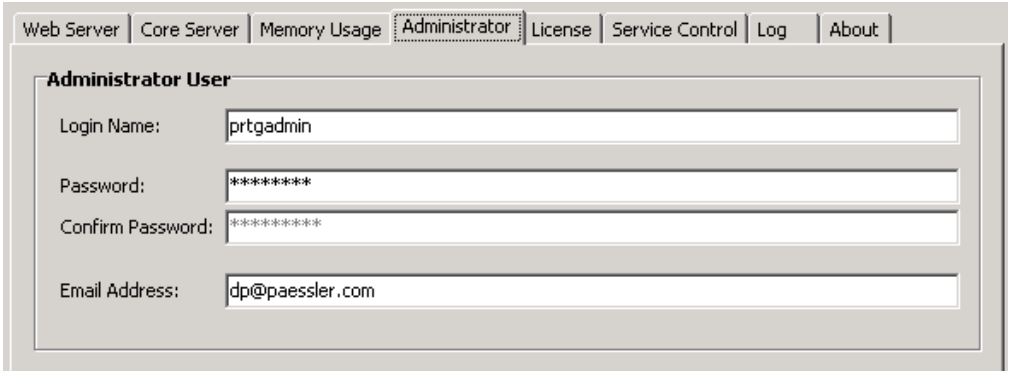
Under the Core Server tab you can define the IPs for probe connections. The connection between core and probe is initiated by the probe 9see Multiple Probes and Remote Probes). You can select to use all IPs, localhost only or individual IPs from the list provided. You can further define the port for probe connections, as well as define a path for all core server data files (you can optionally turn on compression and revert to the default path by clicking on the respective element).

Memory Usage



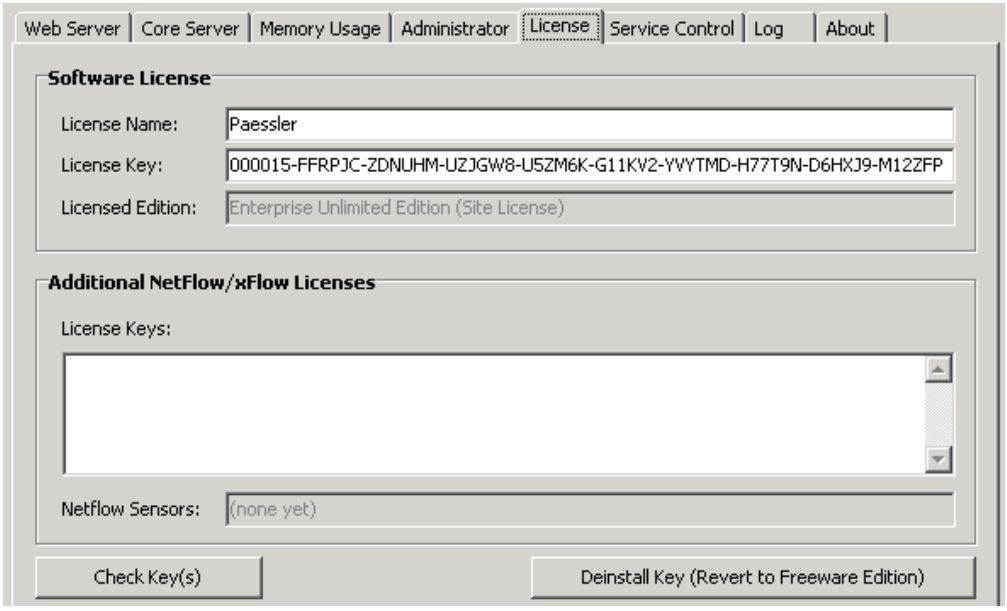
Under the Memory Usage tab you can define timeframes for live graphs, as well as the other three standard graphs displayed under PRTG. You can reduce memory usage by decreasing the graph time frame and increasing the intervals.

Administrator



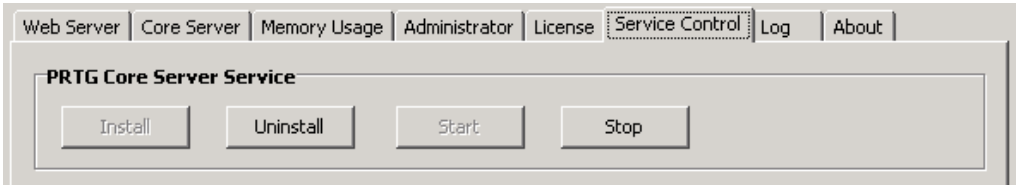
Under the Administrator tab you can define the login name, the password and the email address of the administrator user.

License



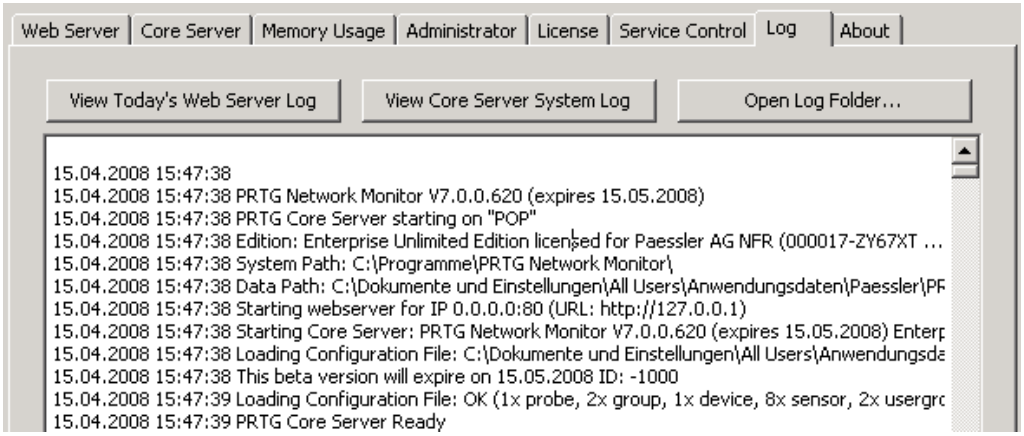
Under the License tab you can enter your program license information (name and key, which will return a license edition value), as well as Netflow/xFlow add-on licenses. Once the licensing information has been entered click on the "Check Key(s)" button to check and activate the same. If you wish to revert to the freeware edition merely click on "Uninstall Key".

Service Control



Under the Service Control tab you can install/uninstall, as well as start/stop the core service.

Log

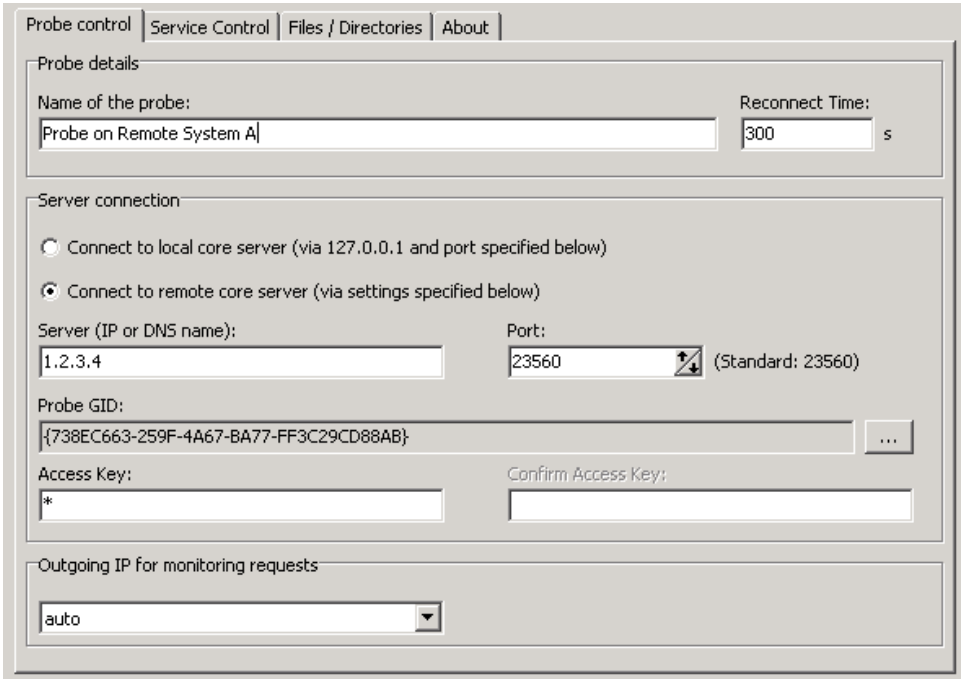


Under the Log tab you can view the current day's web server log, the core server system logs or directly open the core's log file directory.

13.8 Probe Admin Tool

The Probe Admin Tool can be started from the "START | PRTG Network Monitor" program group and allows to configure implemented probes. The Probe Admin Tool is divided into four tabs:

Probe Control



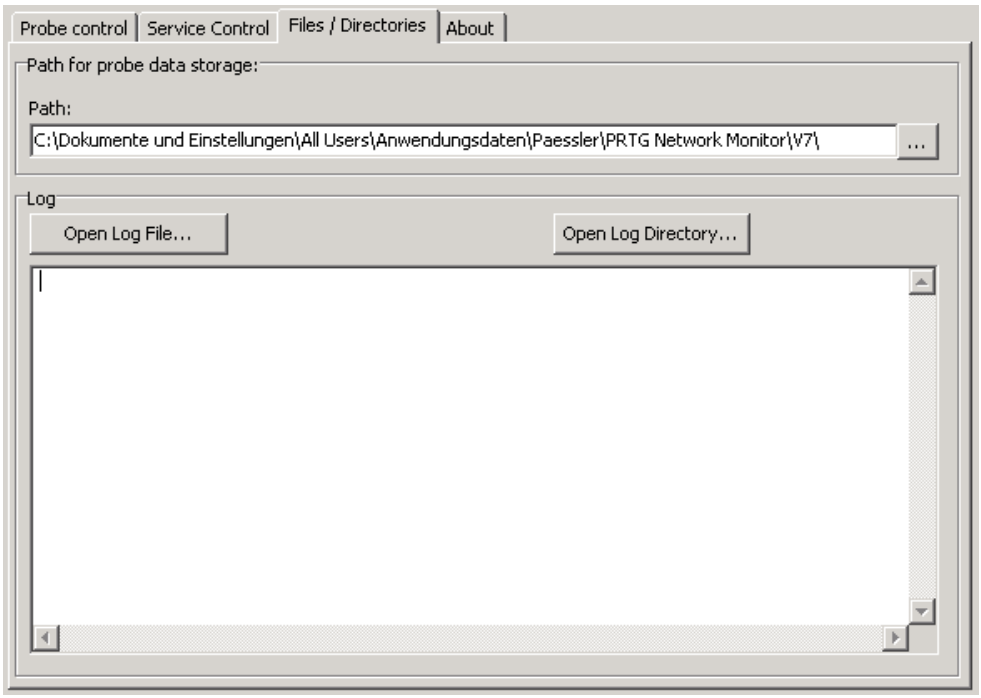
Under the Probe Control tab you can define

- Name of the probe (the name will be shown in the web interface).
- Server Connection: the server's IP or DNS name, as well as the server's port and the probe's access key (these settings must match the settings in the Core Admin Tool, see Multiple Probes and Remote Probes).
- Probe's GID, the unique identifier for each probe (use with extreme caution!).
- Reconnect time (in seconds) which is the time between two connection attempts when the core can't be reached.
- Outgoing IP for monitoring requests: Choose the IP address that all outgoing monitoring requests should use. The setting "auto" is recommended (e.g. it automatically chooses the right IP on multi-homed systems).

Service Control

Under the Service Control tab you can install/uninstall, as well as start/stop the probe service.

Files / Directories



Under the Files/Directories tab you can select a path specifying where probe data is to be stored. You can further open the probe log files and the probe's log file directory.

Part XIV

Technical Topics

14 Technical Topics

14.1 Multiple Probes and Remote Probes

PRTG has two modules that perform the monitoring: The core server, which handles data storage, web server and a lot more, as well as one or more "probes" which perform the actual monitoring.

How Probes Work

As soon as a Probe starts work it automatically connects to its Core Server, downloads the sensor configuration and begins its monitoring tasks. The core server sends new configuration data to a probe as soon as the monitoring configuration is changed by the user. Probes monitor autonomously and send the monitoring results back to the core server for each check they have performed. If the connections between core and probe fails for any reason (e.g. a reboot of the core) the probe continues its monitoring and stores the results.

The connection between probe and core is initiated by the probe, secured using SSL (Secure Sockets Layer). This means that the data sent back and forth between core and probe is not visible to someone capturing data packets. The core server provides an open TCP/IP port and waits for connection attempts from probes. If a new probe connects for the first time the administrator will receive a Todo and will then see the new probe in the sensor tree. As a security precaution, the probe must be manually approved by the administrator (Click on "accept") before any sensors can be created and monitored. The admin can also deny a probe which will then be disconnected. No further connection attempts will be accepted (the probe IP is added to the "Deny IPs" list in the probe system settings). This ensures that unauthorized probes can not connect to a core server.

Since the probe initiates the connection, you must ensure that it can be created from the outside world onto your core server, e.g. you may need to open any necessary ports in your firewall and you may need to specify a NAT rule for your network. The process is the same when you want to allow access to the web server of the core server via port 80.

Note: The local probe is automatically configured and approved and connects to the core via localhost (127.0.0.1) and SSL.

Situations That Require Monitoring Using Remote Probes

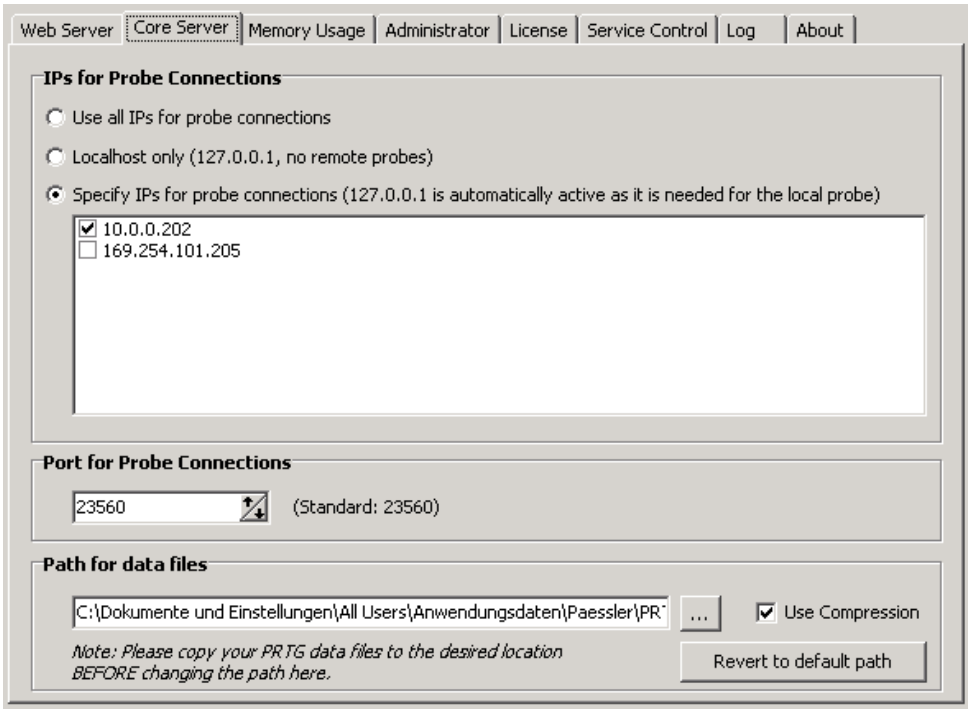
Upon installation, PRTG creates the first probe automatically called the "local probe". The local probe runs on the same machine as the core server and monitors all sensors from this system. Working with only one local probe should suffice for LAN monitoring and if you have just one location that you need monitoring for.

However, there are several situations that make it necessary to work with multiple probes or remote probes:

- If you have more than one location and you need to make sure that services are available from all locations.
- If your network is separated in several LANs by firewalls and the local probe can not monitor specific services across the firewalls.
- If you need to monitor systems in VPNs across public or in-secure data lines.
- If you want to sniff packets on another computer.
- If you want to monitor NetFlow data on another computer.
- If you experience performance issues with CPU intensive sensors like packet sniffing or NetFlow sensors and need to distribute the load onto more than one PC.

Step 1: Preparing a Core Server for Remote Probes

Before remote probes can connect to a core server you must edit the relevant settings in the core server administrator tool which you can find in PRTG's Start menu group:



Be default, a core server only accepts connections via localhost (127.0.0.1) which means that only the local probe can connect. This is the most secure setting. In order to allow external probes to connect you must check "Use all IPs..." or "Specify IPs..." and select one of the IPs of the server. You can also specify the TCP/IP port number.

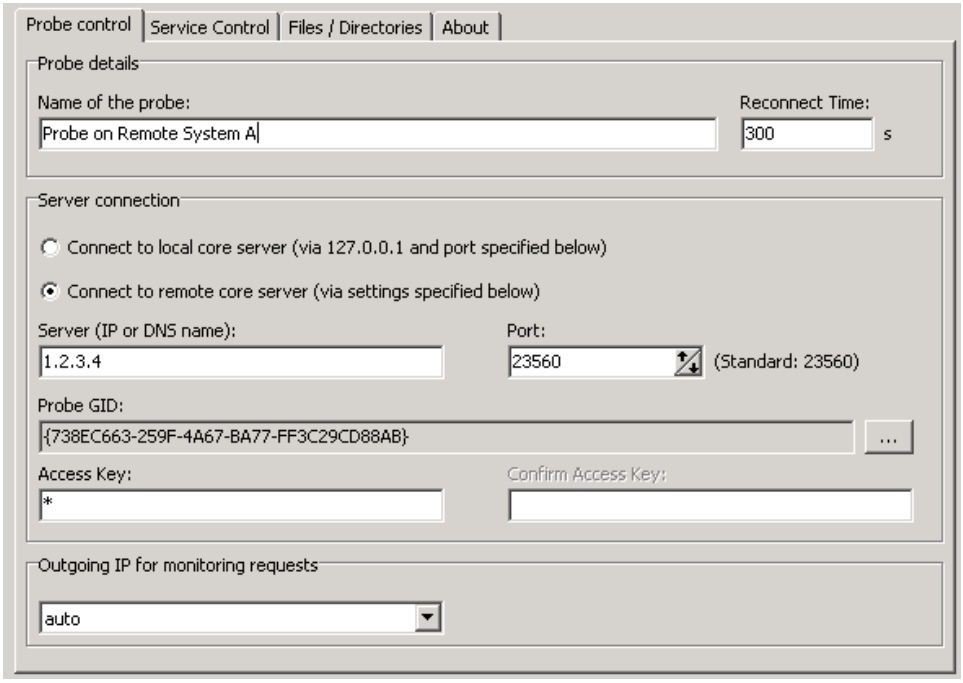
When you are done, click "OK" to save your settings. The core server process will be restarted so that the changes take effect.

Step 2: Setting up Remote Probes

There are two options to install a remote probe:

1. Run the normal PRTG Network Monitor installer on the machine that you want to run the probe on and choose "Remote probe installation only".
2. Go to the web interface of the Core Server installation, go to "Setup|Download", download the Remote Probe Installer and run it. This option is usually faster to deploy because the file is only a few megabytes.

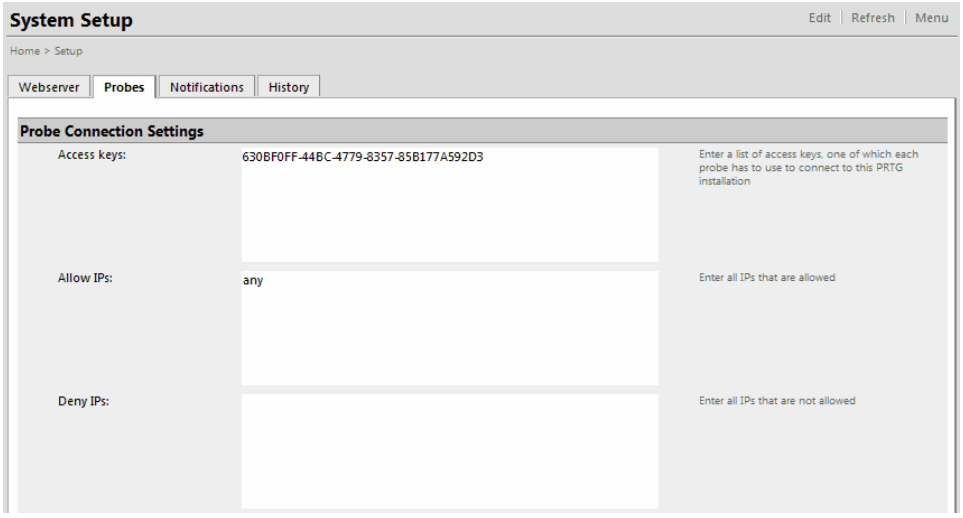
At the end of the installation, in both cases, the Probe Administrator will be started (or you can start it manually from the Start menu later) and you can enter the settings:



The important settings are (See Probe Admin Tool for more details):

- Name of the probe: A name of your choice that will be visible in the sensor tree in the web interface.
- Server Connection: Please choose "Connect to remote core server".
- Server (IP or DNS name). Please enter the server's IP address or DNS name (the one that you have specified in the core server administrator tool above). Note: If the core server resides in a NAT-ed network behind a firewall you must edit your firewall NAT settings and supply the external mapped IP address.
- Port: Please enter the same port number that you have set up in your Core Server above.

You can edit the access keys on the server through the web interface: Choose "Setup|System Setup" from the main menu of the web interface and you will see this screen:



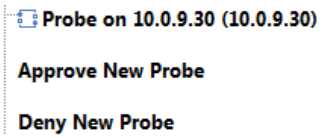
You can enter one or more access keys in the web interface (one for each probe is recommended) and the exact

same string must be entered into the probe's setup, otherwise the core server will not accept a connection. By default PRTG accepts connections from any IP. Using the two settings you can make your configuration even more secure, especially by only allowing authorised IPs. Simply enter these IPs in the "Allow IPs" setting. If you ever need to hard block a probe from a specific IP, please enter the IP in the "Deny IPs" settings.

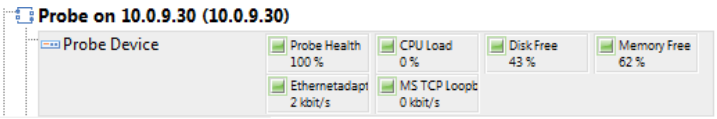
When you are done with the probe setup, the probe service is started automatically and the it tries to connect to the core server.

Step 3: Approving a New Probe

When a new probe has connected to the core server you must approve it in the web user interface:



Click on "Approve New Probe" to fully enable the probe. PRTG automatically creates a set of sensors for the probe to ensure that bottlenecks on the probe will always be noticed. It is recommended to keep these sensors.



Now you can create groups, devices and sensors for monitoring via the new probe.

Debugging Probe Connection Problems

If you have trouble with the setup of remote probes please look at the probe's log files which usually reside in the following folder on the probe system:

Windows XP and Server 2003:

```
C:\documents and settings\All Users\application data\Paessler\PRTG Network Monitor\V7\Logs (System)
```

Windows Vista and Server 2008:

```
C:\ProgramData\Paessler\PRTG Network Monitor\V7\Logs (System)
```

The probe process writes the two log files "PRTG Probe Log (1).log" and "PRTG Probe Log (2).log" alternatively. Please open the one with the most recent date.

For a correct connection the probe log should look similar to this:

```
23.05.2008 16:15:15 PRTG Probe Server V7.0.1.821
23.05.2008 16:15:15 Starting Probe on "WINXPVMWARE"
23.05.2008 16:15:15 Data Path: C:\documents and settings\All Users\a ....
23.05.2008 16:15:15 Local IP: 0.0.0.0
23.05.2008 16:15:15 Core Server IP and Port: 10.0.2.167:23560
23.05.2008 16:15:15 Probe ID: -1
23.05.2008 16:17:01 Connected to 10.0.2.167:23560
23.05.2008 16:17:06 Login OK: Welcome to PRTG
```

For example if the connection fails due to an incorrect Access Key password you will see:

```
23.05.2008 16:31:02 Try to connect...
23.05.2008 16:31:02 Connected to 10.0.2.167:23560
23.05.2008 16:31:07 Login NOT OK: Access key not correct!
```

14.2 Importing Data from PRTG Traffic Grapher 6 or IPCheck Server Monitor 5

You can import your sensor configuration and historic monitoring data from PRTG's predecessor products - PRTG Traffic Grapher V6 or IPCheck Server Monitor 5 - into your PRTG 7 installation using the Import tool.

Every time you run the import procedure, a new group will be created and all imported groups, devices and sensors will be placed in this new group (i.e. if you import from multiple IPCheck and/or PRTG installations each imported configuration will show up in its own group). Depending on the volume amount of historic monitoring data, the import can take between a few minutes and several hours (e.g. for hundreds of sensors with one year of monitoring data).

Please note that the import tool is an optional part of the installation. If you can not find the Import tool in PRTG's start menu group, please rerun the PRTG installer and enable the "Import Tool" option.

Limitations When Importing from PRTG 6

The import process will try to import all groups and sensors, as well as the historic sensor data, with the following exceptions:

- Whenever possible the Import tool will create "devices" from the groups in the PRTG 6 setup.
- Packet sniffing and NetFlow sensors are not imported and must be recreated (because of many technical changes).
- Aggregation sensors are not supported by PRTG 7 and thus are not imported.
- User accounts, custom graphs, notifications, dependencies and schedules are not imported.

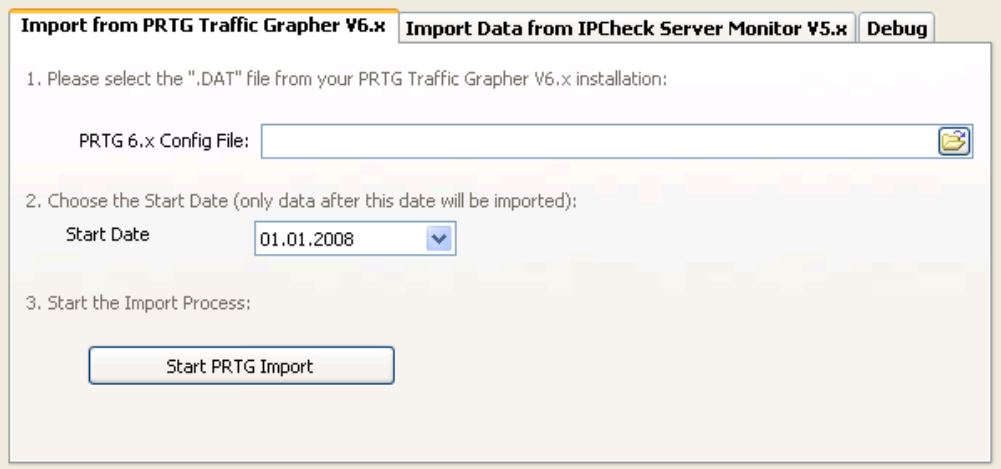
Limitations When Importing from IPCheck 5

The Import process will try to import all groups, devices and sensors, as well as the historic sensor data, with the following exceptions:

- System sensors (service, file, disk space, event log) are imported and converted into WMI sensors.
- SNMP traffic sensors are converted into simple SNMP sensors.
- Script, TCP-script and custom sensors are not imported.
- User accounts, notifications, dependencies and schedules are not imported.

Importing from PRTG 6

- First: Make a backup of your old PRTG system, preferably a full machine backup.
- Now install the latest version of PRTG 6 from the Paessler Website at www.paessler.com on your old system and run it at least once. This will make sure that the file formats are are updated to the format the Import tool expects.
- Stop PRTG 6.
- Start the Import tool from the PRTG 7 Start group. First it will ask you to stop your PRTG 7 services since the import process can not be run while PRTG 7 is in operation.

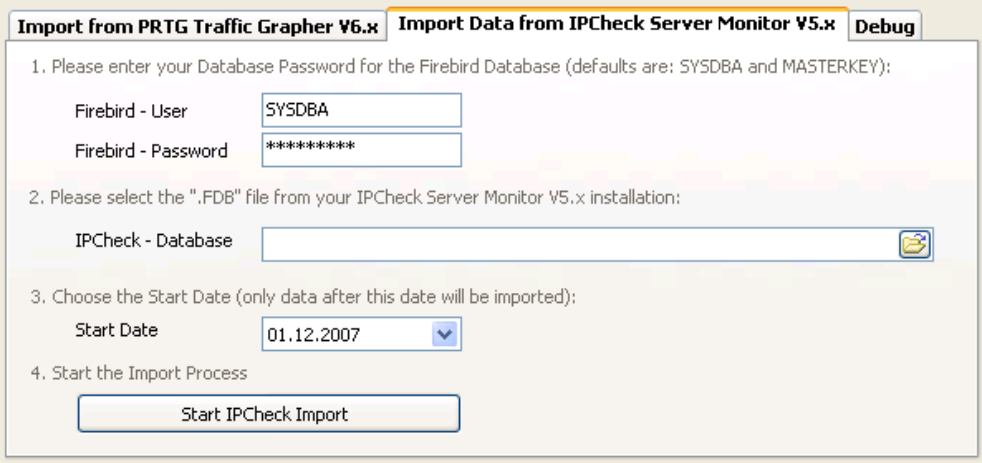


- Then, enter the folder where the .PRTG file is stored.
- Finally, choose a start date.
- As soon as you click "Start PRTG Import" the import process will run and you will see a progress information in the window. After the import process has finished please close the Import tool and PRTG 7 will automatically restart.
- Afterwards, and in case you want your old monitoring to be online again, restart your PRTG 6 services (recommended until the imported sensors are all working fine)

Importing from IPCheck 5

Note: Importing data from IPCheck 5 only works when the data files are stored on local drives. Import from a network drives is not possible.

- First: Make a backup of your old IPCheck system, preferably a full machine backup.
- Install the latest version of IPCheck Server Monitor 5 from the Paessler website under www.paessler.com on your old system and run it at least once. This will make sure that the file formats are updated as the Import tool expects.
- If you are installing PRTG 7 on the same machine as IPCheck 5 is running you can skip the following first step.
- If you want to import IPCheck 5 data from another computer you must manually copy the data: The IPCheck database and the monitoring data files must reside on a local drive. Please stop the IPCheck services and copy the file "ipcheck.fdb" into a folder on your local drive. Then copy the "monitoring data" folder into the same folder as the FDB file.
- Start the Import Tool from the PRTG Start Group. First it will ask you to stop your PRTG 7 services since the import process can not be run while PRTG 7 is running.



- Thereon, enter the credentials required to access the firebird database file of IPCheck.
- Then enter the folder where you have copied the "ipcheck.fdb" file.
- Finally choose a start date.
- As soon as you click "Start IPCheck Import" the import process will run and you will see progress information in the window. After the import process has finished please close the Import tool and PRTG 7 will automatically restart.
- Afterwards, and in case you want your old monitoring to be online again, restart your IPCheck 5 services on the old system (recommended until the imported sensors are all working fine).

14.3 API (Application Programming Interface)

PRTG Network Monitor includes an API that enables access to internal data for external programs. This means that you can create your own programs or scripts that have access to information from the monitoring database and are able to manipulate the object database of PRTG. The API is HTTP based and uses a set of URLs to access the data.

Please see the menu item "PRTG API" in the "Help" menu for details.

14.4 Data Storage

PRTG stores data in four different formats:

- Configuration data (groups, devices, sensors, maps, reports, notifications, etc.) is stored in an XML file which is automatically backed up into a daily ZIP file every few hours.
- Historic monitoring data is stored in a specialized file format that has been heavily optimized for this kind of data. This file format factors in aspects like speedy access (when creating reports) and minimizing fragmentation (which would usually occur for files that steadily grow by small chunks) and is far better for this type of application than SQL servers.
- Todos and log entries are stored in SQLite databases.
- Reports are stored in PDF format.

Automatic data purging mechanisms are included for all file types (user can set the number of days until files are purged, see "Setup|System Settings" in the main menu).

Users can select the location of the data folder on the system’s disks. PRTG automatically enables NTFS file compression for its data folders if available (this saves a lot of disk space, avoids fragmentation and actually

speeds up read access to the files). This behavior can be disabled in the Core Administrator tool.

Note: Support for data storage in third party SQL servers will be available later.

14.5 Security Features

There are various security related features built into PRTG:

- Web server supports SSL encryption (HTTPS).
- All communication between probe and core is secured by SSL encryption, especially important for remote probes that are located outside the LAN.
- Remote probes must present a correct probe access key in order to be allowed access to the core server; furthermore IP addresses can be define to allow / prohibit access.
- Web server checks the user account and the user's rights before delivering any web page.
- Web browser sessions are stored in a session cookie and time out after 20 minutes (if user or auto-refresh is inactive).
- Web server does not deliver files from folders that are not configured by PRTG (avoids directory traversal attacks).
- PRTG internal data management is not based on a SQL server, so SQL injection attacks are impossible.
- User accounts require a password.
- Passwords that are stored internally are always stored encrypted.
- Script files for sensors and notifications can not be edited inside the web interface, user must have access to the file system of the probe system to edit them (this avoids that somebody who is able to access the web interface actually injects and runs malicious scripts on the PRTG system).

14.6 SNMP Helper

Paessler SNMP Helper enables PRTG to collect in-depth performance information from Windows servers and workstations. Up to several thousand PC parameters and performance counters can be monitored with just a few mouse clicks.

SNMP Helper License Options

There are three different available variations:

- Freeware Edition: Supports monitoring of memory, disks, network, and processors and comes free with the PRTG installer.
- Pro Edition: Adds more than 2000 performance counters for servers and workstations running Windows 2000, XP or 2003.
- Pro Extensions: Are available for in-depth monitoring of MS Exchange Server, MS ISA Server, MS SQL Server and MS Biztalk Server.

Fully Integrated Into PRTG

Simply install SNMP Helper on Windows 2000, XP or 2003 systems and you can monitor numerous performance counters using PRTG - simply by adding new sensors: PRTG provides built-in support for the additional counters. Within a few minutes you will be able to monitor values like "disk writes/s", "DHCP Server Requests/s", "Exchange Server: Messages/s", "SQL Server: Requests/s"and many more.

We have compiled a list of recommended performance counters that you can monitor using SNMP Helper. You can find the same in our knowledge base under www.paessler.com/support .

SNMP Helper Freeware Edition

The Freeware Edition supports about 80 performance counters and is part of the PRTG download. You must install SNMP Helper on the machine(s) you want to monitor. After installing PRTG you will find the SNMP Helper Freeware setup files in the "/website/public" sub-folder of your PRTG installation and you can download it from the web interface (select menu item "Setup/Downloads"). Run this setup on all the systems you want to monitor. Afterwards you can monitor the additional system parameters by simply adding new sensors.

SNMP Helper Pro Edition and its Extensions

The Pro Edition of SNMP Helper offers the ability to monitor more than 2000 counters for Windows 2000, XP, and 2003. With the optional SNMP Helper Extensions you can additionally monitor the following Microsoft Server applications:

- MS Exchange Server: more than 1726 performance counters
- MS SQL Server: more than 511 performance counters
- MS Biztalk Server: 32 performance counters
- MS ISA Server: 149 performance counters

Detailed lists of supported counters are available under www.paessler.com/snmphelper.

To use SNMP Helper Pro, you must either purchase a license or you must request a Free 30 Day Trial License. Either way you will receive a license key and the installation files via email. Please install the software on the server that you want to monitor and enter the license key that comes with it. Afterwards you can monitor the additional system parameters by simply adding new sensors to PRTG.

Installing Paessler SNMP Helper

Paessler SNMP Helper is a small library that makes it much easier to access system parameters of Windows machines using SNMP. If the SNMP Helper is installed PRTG Traffic Grapher will be able to read various system parameters from this machine. SNMP Helper can be used on Windows XP, 2000 and 2003. You only need to install SNMP Helper on a computer if you want to monitor it! You must install SNMP Helper on each Windows computer you want to monitor using the additional sensors.

First, make sure to install the Windows SNMP component using the Add/Remove Software control from your Windows Control Panel (see “Howto: Installing SNMP Service on Windows NT/2000/XP”).

In order to install Paessler SNMP Helper, launch the" Paessler SNMP Helper Freeware Setup.exe" file located in the "/installers" subfolder of your PRTG installation directory after you have installed PRTG Traffic. This will launch the Paessler SNMP Helper Setup Wizard.

Once you have read the information provided in the welcome screen click Next to continue installation. From the Select Destination Location window use the Browse button to select a directory in which to install the Paessler SNMP Helper. You can also enter the destination location directly in the provided box. Once you have chosen your destination location, click on Next to continue.

Once Paessler SNMP Helper is installed, the program will prompt you that it needs to restart the machine in order to complete the installation process. If you are ready to restart your machine, select this option from the

provided menu. Otherwise, select to restart your computer later.

Note: Keep in mind – in order for the Paessler SNMP Helper to work properly, your system has to be restarted. If you opt to restart the machine later you will need to do so before the Paessler SNMP Helper can be fully put into operation.

14.7 Interface Definition for Custom EXE Sensors

Every time the sensor is run, the selected EXE or DLL file is executed.

EXE Sensors

The string entered in the parameter field of the sensor's settings is placed in the command line. The EXE file must send the results to the Standard OUT. The data must be in the following format:

```
value:message
```

Value has to be a 32bit integer and will be used as the resulting value for this sensor (e.g. bytes, milliseconds, etc.), message can be any string and will be stored in the database.

The EXE's exit code has to be one of the following values:

- 0: ok
- 1: warning
- 2: system error (e.g. a network/socket error)
- 3: protocol error (e.g. web server returns a 404)
- 4: content error (e.g. a web page does not contain a required word)

If the EXE does not return control to the PRTG process it is killed as soon as the timeout value set for this sensor is reached.

You can test the EXE file you want to use for the sensor very easily on the command line (cmd.exe). Simply start the EXE file and pipe the results into a file, e.g.:

```
sensorexe parameter > result.txt
```

The results are then written into the file result.txt and you can check the results with notepad or any other text editor.

DLL sensors

Every time the sensor is to be checked the selected DLL file is called. The DLL must export one function:

```
function perform(para,msg:pchar):integer; stdcall;
```

para and msg are zero terminated strings. The allocated buffer for msg is 255 bytes, the DLL must make sure that fewer bytes are returned. Msg must be in the following format:

```
value:message
```

Value has to be an 32 bit integer and will be used as the resulting value for this sensor (e.g. bytes, milliseconds, etc.), message can be any string and will be stored in the database.

The integer return value of the perform function has to be one of the following values:

- 0: ok
- 1: warning
- 2: system error (e.g. a network/socket error)
- 3: protocol error (e.g. web server returns a 404)
- 4: content error (e.g. a web page does not contain a required word)

Warning: If the function call in the DLL does not return control it could block the whole PRTG system. Make sure to handle your own timeouts and build in a reliable error management. For this reason EXE sensors are recommended.

Links

Sample projects for Custom Sensors can be found in the Knowledge Base on the Paessler Website under www.paessler.com/support.

14.8 Acknowledgements

Build using Indy Internet Direct (http://www.indyproject.org/). This product includes cryptographic software written by Eric Young (eay@cryptsoft.com). Uses the net-SNMP library, see "netsnmp-license.txt". Uses the DelphiZip library distributed under the GNU LESSER GENERAL PUBLIC LICENSE (http://www.delphizip.net/). Uses the Info.Zip library, license info in the provided "info-zip-license.txt". Uses FastMM (http://sourceforge.net/projects/fastmm/) and TPLockBox (http://sourceforge.net/projects/tplockbox) under the Mozilla Public License 1.1 (MPL 1.1, available from http://www.mozilla.org/MPL/MPL-1.1.html).

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